THE EFFECTS OF IN-VITRO FERTILISATION ON PARENT-INFANT COMMUNICATION

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DECLARATION

I declare that this thesis is composed by me
and that this work is my own.

Signature:

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ABSTRACT

A review of the literature on the effects of infertility and in-vitro fertilisation (IVF), delineating the effects of both infertility and IVF on each member of the couple separately, on the emotional, sexual relationship of the couple and on their relationship to offspring, concludes that both infertility and IVF are emotionally taxing events. From the few studies on the effects of IVF on infants it is concluded that IVF infants develop "normally", and whenever problems are observed these are due to the effects of prematurity, and not to IVF per se. Precise analytical techniques using video are effective in the evaluation of emotional processes in mother-infant communication, and these methods have been successfully applied to demonstrate important effects of maternal emotional disorders, such as postnatal depression. The present thesis proposes that this approach is useful in understanding parent-infant communication when IVF is employed.

Three groups of infants participated in the study: 8 born after IVF treatment employing parental gametes, 8 born after standard infertility treatment (INF), which did not include IVF, and 8 infants whose parents had not experienced infertility problems (No Infertility Problems :NIP). All three groups were videotaped in their homes in a free play situation with their mothers when the infants were 4, 7, 13, and 21 weeks old. Fathers were also videotaped with their infants when the infants were 21 weeks old.

At the first visit all mothers were screened for depression with the Edinburgh Depression Scale, and were administered the Recent Experiences Life Event Scale. Interviews, concerning the individual experience of couples on pregnancy, birth and their relationship with their infant, were administered to all mothers at the first and last visits and to fathers at infant age 21 weeks. Three minutes extracts of all videos were reviewed in detail and an objective coding system for the style of communication was applied. For each type of parental and infant episode, the data was subjected to two separate repeated measures of analyses of variance : a two-way analysis of variance with three levels for group

(IVF, INF, NIP), and four levels for infants age (4, 7, 13, 21 weeks); a two-way analysis of variance, with three levels for group and two levels for parent (mother and father), applied to data for infants aged 21 weeks. Finally, intercorrelations (Pearson's correlation coefficients) between the various types of parental and infant episodes were performed.

Important findings are as follows: parental "caretaking" episodes were very infrequent by the age 21 weeks in the control group only. Infants of both the IVF and INF groups showed significantly higher frequencies of the "play" episodes than the control group ($p = 0.018$ and $p = 0.004$, respectively).

The present results indicate that communication between parents and IVF infants appears to develop along the "normal" path. When differences were observed, these occurred in both the IVF and INF groups, which suggests that IVF, as such, does not, in general, affect either parents or their infants, and any effect is due to the infertility experience common to both these groups.

CONTENTS

TABLES

FIGURES

PREFACE

1. AIM OF THE THESIS

The method of in-vitro fertilisation (IVF) has given hope to many infertile couples, who some years ago did not have the possibility of giving birth to their genetic offspring. As the method proliferated, a growing body of empirical evidence emerged concerning the effectiveness of IVF , and the effect of the method on the infants and on their parents. Studies designed to answer pertinent questions have been conducted, employing standardised questionnaires, interviews and tests.

The thesis was designed to study parent-infant communication in families that have been formed as a result of IVF, and to follow communication through the first five months of the infants' lives. The pattern of communication displayed in IVF families was compared to that of families created after infertility treatment, and to families with no infertility history. Precise analytical techniques using video, which have proved effective in the evaluation of emotional processes in mother - infant communication, were employed.

The study of parent-infant communication in families created by IVF was prompted by the following considerations: First, regarding the current importance of the application of technology to procreation. Second, on the basis of available data, while there appears to be evidence that the psychological development of IVF infants is "normal", there are discrepant findings regarding the effects of the method on parenting. Third, it was considered important to apply observational techniques in an attempt to capture the quality of communication in parent-infant dyads where the mother has received IVF treatment in order to become pregnant.

2. OVERVIEW OF THE THESIS

A review of the literature in infertility and research studies regarding its effect on individuals and on couples will concern Chapter 1. In Chapter 2 the literature on in-vitro fertilisation (IVF) and its effect on individuals and couples is reviewed.

Chapter 3 focuses upon studies conducted in an attempt to evaluate the emotional processes in mother-infant communication. In Chapter 4 the Pilot study is discussed. Chapter 5 presents the process employed for the recruitment of the subjects, as well as the procedure employed for the data collection. In Chapter 6 the focus is on the development of the coding system employed for the analysis of the videos. The statistical analysis and the results are presented in Chapter 7. In Chapter 8 the implications of the findings and their comparison to the previous findings are discussed.

CHAPTER 1

INFERTILITY AND ITS EFFECTS

In this chapter, following a presentation of the causes and the significance of the problem of infertility, the question of its definition is discussed and a brief historical review is provided. After this brief discussion, the theoretical aspects of the desire for a child are presented. The importance of fertility is acknowledged in well-known works of literature, in the church's view and in anthropological studies. Lastly, a review of the literature regarding the effects of infertility on individuals, couples and offspring is presented.

1. INFERTILITY DEFINED

Infertility encompasses complicated psychological, social, ethical and legal aspects. There is no agreed standard definition of infertility. This is understandable, considering how difficult it is to diagnose the condition. Problems relating to conceiving range from absolute sterility to sub fertility. Because of this lack of an agreed upon definition of infertility, many people may be misdiagnosed (Stephenson & Wagner, 1993). Two well-known international organisations, the World Health Organisation (W.H.O.) and the Office of Technology Assessment (O.T.A.), disagree on the definition of infertility. According to W.H.O. (1975), infertility refers to a state of no conception after cohabitation and exposure to the possibility of pregnancy for two years whereas, O.T.A. (1988), defines infertility as the inability to conceive after 12 months of intercourse without contraception. Marsden Wagner (Stephenson & Wagner, 1993, p. 3), believes that both definitions are "inherently flawed", because they allow a substantial number of fertile people to be diagnosed as infertile. When the definition employed by the OTA is used, only 16% - 21% of couples diagnosed as infertile remain so throughout their lives.

Furthermore, according to a number of researchers, about 30% of couples take more than a year to conceive (Stephenson & Wagner, 1993, p. 4).

When defining infertility, it is essential to distinguish between primary infertility, which refers to women who have never conceived, and secondary infertility, which refers to women who have conceived and have thereafter developed an infertility problem.

2. HISTORICAL REVIEW OF INFERTILITY

In antiquity, fertility was thought to be controlled by magic, the Gods, or the moon, while astrology and numerology provided dates and numbers that could enhance the likelihood of conception (Leiblum, 1997). In many primitive tribes, such as the Ingarda Tribe in Australia, conception was not associated with the sexual act and fertilisation was thought to occur when the woman ate something specific. Also, the Trobian Islanders believed that pregnancy occurred with the rupture of the hymen by whatever means and that sexual intercourse was not associated with fertility (ibid.).

Lazzaro Spallazani in 1786 was the first to establish that spermatozoa were essential for fertilisation, while only in 1827 Van Koltiker realised that spermatozoa were formed in the testicular cells and fertilised the ovum. J. Marion Sims, an American gynaecologist, as late as 1866, indicated with the microscope the presence of sperm in the semen (ibid.).

The first American book on infertility was published in the middle of the nineteenth century. Very few books and papers had appeared on the subject until then.

In the 19th century, infertility was not referred to as a distinctive diagnostic entity, but was viewed as a symptom resulting from different medical and gynaecological disorders - such as leukorrhea, menstrual irregularities and others. This symptom could be cured if the illness that caused it was cured. Infertility became a separate diagnostic entity and a social phenomenon by the end of the nineteenth century. There was, however, disagreement among doctors regarding the causes of infertility and the treatment of patients. The causes were usually attributed to fault in women. Sperm problems were known to exist, but as male infertility was equated with impotence, doctors --

who were mostly men -- were hesitant to attribute infertility problems to males (Sandelowski, 1993).

Around the 1900's, a significant decrease in the white population was noted in the U.S.A. This decrease, which was attributed to a reduction of childbearing within marriage, caused alarm. The fact was ascribed mainly to women's changing role (Zelizer, 1981). A number of gynaecologists went even so far as to attribute the lowering of fertility to women's involvement in intellectual pursuits (Haller & Haller, 1974). Thus, it was stated that women, by becoming career oriented, first, encountered the stresses associated with achievement which affected their ovulatory pattern, and second, delayed having children which resulted in lowering their fecundity as they were by now older. The ambience of the time is illustrated in the aphorism which states that women succeeded in obtaining more Ph.D.'s but failed in producing enough children (White, 1981). This attitude was strengthened by an article in a journal written by a woman who claimed that she was able to conceive only after she

"stopped striving for a career and started leading the domestic life prescribed for women"(Sandelowski, 1993, p. 35).

It is also worth mentioning that in discussing Shakespeare's play Macbeth, Freud attributes the couple's infertility to Lady Macbeth although in the play it is clearly stated -- as seen from the extract below -- that lady Macbeth had a child.

Lady M:
I have given suck, and know
how tender'tis to love the babe that milks me:
I would, while it was smiling in my face,
Have pluck'd my nipple from his boneless gums,
And dash'd the brains out, had I so sworn
As you have done to this.
(Shakespeare,1997. Macbeth, act, 1, scene vii)

This shows that Freud himself was strongly influenced by the myth that infertility was solely a female problem (Freud, 1916).

In the early twentieth-century there appeared a growing concern for veneral diseases and for their involvement in infertility. An incidence of marriage infertility could now be attributed to men's sexual activities outside wedlock. However, the reluctance of doctors to ascribe infertility to males continued, and men were not held responsible even if only one sperm cell could be shown to be viable. Thus, the inability to procreate continued to be primarily attributed to women (Sandelowski, 1993). As McWhinnie (1996) stresses, infertility has many myths, one of which is that it is by and large a woman's problem.

During the 1940's an increasing interest in psychosomatic medicine and in the Freudian theory led a number of physicians to explain infertility as an indication of an unconscious hostility or fear toward child bearing. This interpretation was particularly useful in explaining infertility in cases where no organic cause was detected. As Susan Sontag (1991, p. 58) states: "Illness is interpreted as, basically, a psychological event, and people are encouraged to believe that they can cure themselves by the mobilization of will".

From the above an interesting historical trend is evident : couples, at first, and, especially women, were seen as responsible for being unable to procreate because of personal choices -- such as their new vocational interests -- which were considered to cause dysfunction in the female reproductive system. Subsequently, couples, and, again primarily the women, were blamed for their unconscious desires which were in conflict with their conscious ones and resulted in infertility. A woman's contact with multiple sexual partners has also been linked to infertility. In conclusion, immediately after World War II, marital sterility was mainly attributed to social and psychological causes.

These attitudes influenced the way infertility is perceived even today. The desire for a child still has a strong social component and couples with no children are pictured as handicapped and they are stigmatised (Centre des Nouvelles Parentalités, 1995). This applies more to women, since, despite the

availability of new roles, biological maternity remains their central function (Sandelowski, 1993).

3. PREVALENCE OF INFERTILITY IN THE POPULATION

As has been said, there seems to be disagreement regarding the prevalence of infertility. Some researchers argue that infertility affects about 10-20% of couples, or 1 in every 6 couples face the problem of infertility. These numbers are constantly increasing. According to the National Centre for Health Statistics the percentage of infertile couples increased from 14.4% in 1965 to 18.5% in 1995 (Newsweek, September 4, 1995, p. 40 in : Leiblum, 1997, p. 8). Recently it has been suggested that in the last decades there has been a reduction in sperm quantity and quality (Wright, 1996, in Leiblum, 1997). Some researchers are becoming alarmed that infertility has reached epidemic proportions (Bellina & Wilson, 1985). Whereas, others disagree with this view and believe that infertility rates have not changed in the last century and remain around 3-4% (Delaisi de Parseval & Janaud, 1983; Wagner & Stephenson, 1993).

The difference in the two points of view arises partly because no uniform definition of infertility is employed. The latter group of researchers accept as infertile only those couples with a confirmed organic cause, whereas the former group of researchers include in the infertile group couples with unexplained infertility. It has been confirmed that the number of visits to specialists for infertility has increased in the U.S.A. from about 600,000 in 1968 to 1.6 million in 1984 (Sandelowski, 1993). This could be taken to support the view that infertility rates are actually increasing. However, those who disagree with this interpretation argue that this increase is due to the fact that new technologies have been presented as solutions to infertility problems, and therefore many more people visit physicians than they did ten years ago (Mosher & Pratt, 1991). Moreover, many more physicians have specialised in the medical area of infertility and thus, a lot of publicity is given to the advances of technology in the field. This results in a greater number of people seeking advice from infertility experts.

Lastly, the decline in numbers of healthy infants available for adoption has also affected the demand for assisted reproduction, and many couples, who would otherwise have adopted, now attend infertility clinics thereby giving the impression that infertility rates have dramatically increased.

According to the National Centre for Health Statistics in 1982, 16% of married couples in the USA cannot have a child (Berg & Wilson, 1991).

4. CAUSES OF INFERTILITY

The causes of infertility vary. According to WHO's Standardised Investigation of the Infertile Couple (1987), prevalent causes for female infertility are tubal obstructions, pelvic adhesions, tubal abnormality, anovulatory cycles, endometriosis. No demonstrable cause accounts for about 40% of the cases. The most common causes for male infertility are varicocele, testicular failure, accessory gland infection, abnormal sperm morphology, low sperm motility. In 49% of cases there is no demonstrable cause (Wagner & Stephenson, 1993). About 50% of infertility cases are due to a female factor, while 40% are due to a male factor and in about 10% of cases no definitive diagnosis can be given. In about 20% of infertility cases a combination of male and female factors are responsible for the infertility (Campana & Lemière-De Vita, 1985).

When infertility cannot be attributed to an organic cause it is designated as "unexplained ". It has been suggested that in at least a number of such cases the causes may be psychogenic. Psychogenic infertility, is supposed to betray fear and to be a defence against the dangers of reproduction (Mozley, 1976). Psychoanalysis views psychogenic infertility as the consequence of unconscious factors which affect procreation (Faure & Pragier, 1987). These factors could be an incestuous fantasy where the imaginary child is viewed as a consequence of the unconscious oedipal desire. This oedipal fixation results in infertility, which is a punishment for the incestuous desire. Another unconscious factor held to be responsible for the infertility is the desire for a child which in actuality reflects the desire for power, as well as a narcissistic compensation for the feeling of castration, which, according to Freud, every

woman experiences. These desires, however, are in direct opposition to femininity, which, in such cases, is totally suppressed while masculinity is dominant. According to this theory, the desire to be a male invests the imaginary infant as a substitute of the parental penis and the pregnancy is seen as a theft of the penis. A third psychogenic cause of infertility -- according to the Psychodynamic School of thought -- takes the form of sterilities that occur after the death of a loved person. These infertilities reflect the body's refusal to give birth to an infant that could take the place of the dead person. Such infertilities indicate that the mourning process has not been accomplished. Lastly, psychogenic sterility has been attributed to the relation with the archaic mother. Groddeck (1963) was the first to maintain that women who detested their mothers could not become mothers themselves. This viewpoint has also been discussed by Deutsch, (1944) and Benedek et al. (1953).

According to Pasini (1983) no infertility, even one that has no apparent demonstrable organic cause, should be attributed to psychological factors. This author, in supporting his view, cites a striking example of such cases concerning miscarriages, which were initially considered as psychogenic. However, the systematic study of aborted embryos revealed that in about 40% of these miscarriages there was a physical cause. A genetic malformation was responsible for the miscarriage. Therefore, when no demonstrable organic cause is identified infertilities should be considered as infertilities with no demonstrable organic cause because with the increase of medical knowledge infertilities initially considered as psychogenic, were later attributed to organic causes (Edelmann & Golombok, 1989). A number of authors argue that psychological factors may, in fact, be a cause of infertility. They claim that anxiety and depression could influence endocrine functioning and thus reduce the probability of conception. Ovulation may be influenced by emotional and psychological factors. Women in concentration camps, for example, suffered from amenorrhoea although their nourishment was still sufficient and they had not been mistreated. The knowledge that they were condemned to die affected their reproductive system (Pasini, 1983). However, on the basis of the studies conducted to the present, psychological factors are judged to play a small part in the aetiology of childlessness (Edelmann & Connolly, 1986; Paulson et al., 1988). Some

researchers believe that an effective method in identifying the presence of psychological factors resulting in infertility is the use of a psychodynamic interview which detects motivational conflict in reproduction (Astor & Pawson, 1985). Clearly, "psychological" and "organic" factors will interact in any case.

5. DESIRE FOR AN INFANT

The developments in reproduction have transformed the process of the desire for an infant. The use of contraception disconnected the sexual act from procreation. This further brought a simplified distinction between a "desired infant" -- which seemed to be only the planned infant -- and a "non-desired" infant -- the non-planned infant. Before the use of contraception the desire for a child usually followed conception, whereas now, the desire precedes conception. This change brought forth an illusion that the reproductive system is solely dependent on the desire to procreate. Thus, couples use contraceptives up to the time they desire a child. Then, they discontinue contraception and expect pregnancy immediately to occur.

The wish for an infant is one of the many manifestations of human desires. It is a complex desire as it refers to the man's and the woman's fantasies bound together with the fantasies of their families (Chatel, 1993). Freud, with no evident factual support, suggests that the desire for an infant reflects the woman's unconscious wish to become pregnant in order to replace the lost male sexual organ. Thus, he associates the desire for an infant to the "penis envy". The little girl, he claimed, develops the castration complex when she sees the male sexual organ. She immediately realises the difference between female and male sexual organs and considers that hers is lacking. Therefore, she wishes to have something like the male one. This penis envy leaves enduring traces in the development and formation of her character and femininity is only restored when the desire for the penis is replaced by the desire for an infant (Freud, 1933). Following Freud, Melanie Klein (1975) maintained that the desire for the paternal penis in an object-libidinal sense as granting infants precedes the wish for an infant. However, another psychoanalyst, Helen Deutsch, criticises this opinion and states that, the

narcissistic humiliation provoked by the vision of the penis leaves a strong impression to the little girl, but cannot account for all the subsequent manifestations observed in the development of a woman (Deutsch, 1944). Monique Bydlowski (1992), on the other hand, proposes that a woman's desire for an infant goes through a twofold identification with her mother. On the one hand the characteristic adolescent rivalry with the mother has to be surpassed. The idea that her mother is incomparable and omnipotent because she is desired by her father must be relinquished. The mother should be viewed as needing an infant that she cannot herself produce but can acquire it through her daughter, so that the generations are perpetuated. On the other hand, the daughter must also have experienced a "good enough mother", in Winnicott's (1962) sense, in order to be able to become a mother herself.

It has been suggested (Brazelton & Cramer, 1991) that some of the causes of a woman's desire to become pregnant include a desire to reproduce herself, to fulfil unmet needs from childhood and adolescence, to alleviate doubts about her fertility and reproductive capacity, to satisfy various narcissistic needs, to renew old ties in the new relationship with her child, to find her ancestors, to restore ideal child conditions and to reconstruct ideal parent-infant relationships.

According to psychoanalysis the masculine wish for a child is first grounded in the desire of the boy to be like his mother. Freud, in the story of Little Hans describes a 5 year old boy who imagined he too could bear his father's child (Freud, 1909). Delaisi de Parseval (1981), on the other hand, states that men and women are extremely similar when facing procreation, the only difference being that in order to become a mother a woman identifies more with her own mother, whereas the man with his father. In accordance with De Parseval's view it is noted that men have needs similar to those of women. The narcissistic wish to be complete and omnipotent by producing and identifying with one's child is universal, as is the wish to reproduce one's own self. Men also long for a baby in order to reassure themselves regarding their potency and their power to make their wife pregnant. Both men and women through their wish for a child also want to conform to the ideals of society and of family and to secure the succession of their ancestors

(Bydlowski & Dayan-Lintzer, 1985; Delaisi de Parseval, 1989; Brazelton & Cramer, 1991). Freud, (1900), in The Interpretation of Dreams (Brazelton & Cramer, 1991, p. 35) declared -- children are "our only path to immortality"; a view shared by Plato as can be seen in the following extract:

"το ανθρώπινον γένος φύσει τινί μετείληφεν αθανασίας, ου και πέφυκεν επιθυμίαν έσχειν πας πάσαν, το γαρ γενέσθαι κλεινόν και μη ανώνυμον κείσθαι τετελευτηκότα τοιούτου εστίν επιθυμία. Γένος ουν ανθρώπων εστίν τι συμφυές του παντός χρόνου, ό δια τέλους αυτώ συνέπεται και συνέψεται, τούτω τω τρόπω αθάνατον όν τω παίδας παίδων καταλειπόμενον, ταυτόν και εν όν αεί, γενέσει της αθανασίας μετειληφέναι, τούτου δε αποστερείν εκόντα εαυτόν ουδέποτε όσιον εκ προνοίας δε αποστερεί ός άν παίδων και γυναικός αμελή"
(Πλάτωνος Νόμοι Δ΄ 721 C σελ. 450).

"Here is a sense in which nature has not only somehow endowed the human race with a degree of immortality, but also implanted in us all a longing to achieve it, which we express in every way we can. One expression of that longing is the desire for fame and the wish not to lie nameless in the grave. Thus, mankind is by nature a companion of eternity, and is linked to it, for ever. Mankind is immortal because it always leaves later generations behind to preserve its unity and identity for all time: it gets its share of immortality by means of procreation. it is never a holy thing to deny oneself this prize, and he who neglects to take a wife and children does precisely that.
(Plato, Laws, translated by Trevor, J. Saunders, Penguin, Harmondsworth, 1970, p.183).

The desire for an infant is certainly complicated and often contradictory. The imaginary child, according to the psychodynamic school of thought, is seen as the perfect child which will honour the parent's ego-ideal. This child is not only seen as an extension of the mother's body but, as Kohut (1977), mentions, her grandiose self-image. It has been argued that when mentioning the desire for an infant it is important to distinguish between begetting, rearing and bearing children (Chadwick, 1992). The desire to bear and rear children is obvious. The desire to beget is also present, refers to passing on one's genes and is important to both parents. This desire was seen as central

in the Warnock Committee Report which stresses that the desire for a child is also socially induced and recognises the relevant social pressure by stating:

"Family and friends often expect a couple to start a family, and express their expectations, either openly or by implication...Parents likewise feel their identity in society enhanced and confirmed by their role in the family unit" (Warnock Report, 1984, para. 2.2).

Consequently, the desire for a baby comprises many motives and different desires. The couples that cannot procreate face the problem of the non-realisation of their desire for an infant. When their infertility is identified they face a personal and social failure: personal, because their sexual identity is questioned and social as they do not abide by society's norms (Raoul-Duval, 1992). This experience is equivalent, to a personal loss - a bereavement.

6. THE IMPACT OF INFERTILITY

6.1 The Importance of Procreation

The importance of fertility is depicted dramatically in two famous plays. The first *Yerma*, by Federico Garcia Lorka, written in 1934 is according to the poet himself "the living poem of fertility created from the deadline of the sterile" (Lorka, 1990, p. 6). The choice of the name of the heroine indicates from the beginning Lorka's view of the impact of infertility. Yerma in Spanish means wasteland or unproductive land. The play shows the tragedy that Yerma experiences when her attempts to become a mother fail:

"Why was I born among mirrors?
Like a dry orange tree
with its moving shadow
stillborn under every sun,
woodcutter, cut my shadow for me...
Free me from my pain
of seeing myself without fruit"....(Yerma, p. 50)

and again:

"Dolores: You'll definitely have a baby now. I can promise you that.

Yerma: I will because I have to. Or else I've no place in this world. There are times when I feel so sure that I'll never ever... and a wave of fire comes shooting up through me right from the soles of my feet and everything seems so empty, as if the men in the street, and the bulls and the stones, were made of cotton wool. And I wonder what point there is in anything....
Yerma: All I know is that I'm thirsty, so thirsty. And nobody will let me drink. I want to cradle my baby in my arms so that I can sleep easily at night. Listen to what I'm going to say, because they're terrible words. Even if I knew that my child is going to pull me through the streets by the hair, I would still be overjoyed at his birth. "(Yerma, p. 56)

Ibsen in his play *Rosmerholm,* (1958), presents Rosmer's wife Beatë as becoming mentally disturbed when she discovers that she cannot have children. She was driven to commit suicide by Rosmer's friend Rebecca because of her infertility, and because of her belief that she should leave Rosmer free to have a family.

For the Christian Church fertility is very important. The Old Testament highly values childbearing and systematically refers favourably to large families with many children and especially to sons. The idea that couples with children are blessed, whereas childless couples are weak and inferior comes out strongly. Many Christians feel that a failure to procreate is a sin and causes God disappointment (Trigg, 1997).

An anthropological viewpoint on infertility shows the world-wide emphasis placed on fertility. Furthermore, as the function of the reproductive system was only recently fully comprehended, for many years the causes of infertility remained obscure. As Susan Sontag, explains:

" Any important disease whose causality is murky...tends to be awash in significance. First the subjects of deepest dread (corruption, decay, pollution, anomie, weakness) are identified with the disease. The disease itself becomes a metaphor" (Sontag, 1991, pp. 59-60).

In many parts of Africa feminine sterility is considered as a dangerous condition both for the patient and her entourage. In the Samo of High-Volta the life of an infertile woman is not easy. The status of a woman is not given

to a young girl who has lost her virginity, or even who is married, but is only awarded when conception occurs. Whether the pregnancy is ended in miscarriage or birth is not important, as it is conception that assigns femininity to a girl. While, a woman who has never been pregnant is considered as being immature never reaching the adult status. In the Nuer -- an important settlement in east Africa -- sterile women are regarded as men. If a girl marries and after a number of years does not reproduce she returns to her parental family but with the status of a male. Thus, she is allowed to obtain cows and pays the necessary dot in order to obtain a wife which means that she is literally treated as a man. She can then engage a slave or a stranger for procreation and the children that will thus come to life will see her as the father (Delaisi de Parseval & Janaux, 1983).

The equation that exists between femininity / masculinity and fertility, as well as between punishment and sterility, makes the couples that encounter it face serious problems with their psychosexual identity (Delaisi de Parseval, 1983; Raoul-Duval, 1992). The importance that individuals place on their capacity to reproduce is also seen in those adolescent girls who, although they do not want to become mothers, "forget" their contraception because of their unconscious desire to verify that their reproductive capacity is normal (Naziri, 1989).

The value that people place on fertility is also illustrated by the reaction of pregnant women when facing serious health problems. It is well established that people who encounter life-threatening conditions, function in a way that maximises their chances of survival. However, pregnant women when faced with dangerous situations prefer to sacrifice their chances of survival for the sake of their unborn child (Lilford, 1988; Rosen et al., 1997). A characteristic example is given by a woman 20 weeks pregnant, who suffered from cancer of the neck of the womb and decided to postpone treatment, thereby decreasing the probability of cure, in order to protect her pregnancy. It is also worth mentioning that the majority of infertile women are willing to undergo infertility treatment despite their awareness of the association between fertility treatment and ovarian cancer.

6.2 The Stress of Infertility

Infertility is almost always unexpected. In fact most people entering infertility treatment have been through a period of contraception (Leiblum & Greenfelt, 1997). It is a stressful experience. Since the prevailing view is that reproduction is part of the normal design of the human species, those that cannot reproduce are considered to be outside the boundaries of normality. And, since parenting is viewed as a central life role -- especially for women -- those that do not achieve it can be very upset (Abbey, et. al., 1992). Thus, at least in part, infertility could be experienced as a problem simply because the culture experiences it as such (Sandelowski, 1993). As Sontag, states:

"Illness expands by means of two hypotheses. The first is that every form of social deviation can be considered an illness... (Sontag, 1991 p. 57)".

Clinicians working with infertile couples report the considerable emotional disturbance experienced by these couples who often look back at their personal history and try to find the cause or causes that in their view could "explain" why they cannot have a baby, why they cannot have something which appears to be simple for most people. This search in their personal history may lead them to feel they are punished for things they consider to be sinful, such as premarital sex, abortion, etc. (Menning, 1980). Most couples experience depression after the infertility diagnosis. For some the depression is periodic and brief while for others it is a daily curse encountered during the entire process of infertility treatment (Mahlstedt, 1985; Roegiers, 1994). Infertility is a life crisis. Patients report that no part of their lives is left untouched while they try harder, worry and wonder whether they will someday achieve their goal. Their lives revolve around conceiving. They neglect other goals and needs. The experience of being infertile has been described as a "roller coster" feeling : hope in each new treatment and then disappointment at each new failure. And the cycle is repeated -- one day hope, and the next grief (Mahlstedt, 1985).

Several emotional phases have been identified in the process of coping with infertility : surprise, denial, anger, isolation, grief, -- eventually -- a resolution and hopefully an acceptance of infertility (Menning, 1980). However, some

couples have difficulty in accepting their infertility and experience an increase in the desire for an infant. This phenomenon has been named the syndrome of the "infant at whatever cost" (Bourg, 1995). It is manifested with an extreme urgency at having a baby, an obsession with this idea, with rituals especially obvious when the period is expected, with a decline of the sexual desire and its association only with procreation. It is usually accompanied by depressive symptoms (anxiety, insomnia, anorexia / bulimia, aboulia / hyperactivity), desperation at the appearance of the menstrual cycle and jealousy toward fertile couples. Couples may often require help in order to come to terms with the loss to which infertility is identified, to accept infertility and to proceed with their lives because feelings of guilt and shame often surface and make the loss really difficult to cope with (Berger, 1977). Couples themselves rate infertility as stressful or extremely stressful, more stressful than divorce, when they had experienced both, in short, the most upsetting experience in their lives (Freeman et al., 1985; Mahlstedt, et al., 1987). The stress produced by infertility treatment is rated as coming second only to the death of a family member and to marital dissolution (Baram et al., 1988). The woman's menstruation after an unsuccessful treatment has been named monthly mourning (Friedman, 1989); and this mourning becomes difficult to accomplish because of the indecision and conflict regarding the continuation or termination of treatment. As an infertile woman typically stated :

"Living continually with regrets or with a permanent hope of possible pregnancy, that is for me "genuine sterility", because this hope is often paralyzing"
(Laborie, 1993, p.44).

Infertile women can be perceived as different from other women, as unfortunate and unfulfilled (Callan & Hennessey, 1988a). Furthermore, infertile women score lower in levels of personal adjustment. The degree of stress, anxiety and desperation felt by infertile couples is clearly seen in the higher frequency of suicide among these couples (Seibel & Taymor, 1982). The psychological effects of the length of the treatment have also been examined. Berg and Wilson, (1991) studied 104 couples over a 3 year period. They report that couples experienced distress during the first year, then this feeling abated, while in the third year they became depressed. Other studies

have confirmed these emotional changes over time, while still others have not confirmed the effect of time (McEwan, 1987). It seems that the crucial factor is the number of treatment failures experienced and not the actual time spent in therapy (Boivin et al., 1995) .

Although infertility is a stressful experience the psychosocial profile of infertile couples is not different from that of non-infertile couples (Freeman et al., 1985; Guttman et al., 1986; Wright & Duchesne, 1991) and infertility, as a rule, does not cause serious pathological reactions (Hazeltine et al., 1985; Hearn et al., 1987; Paulson et al., 1988).

6.3 Gender Differences

Infertile men are reported to have lower self esteem and higher anxiety than fertile men (Kedem et al., 1990). Women, however, are reported to show more emotional distress than men (Platt et al., 1973; McEwan et al., 1987; Wright et al., 1991; Balen & Trimbos-Kemper, 1995) although other studies do not detect gender differences (Berg & Wilson, 1990; McEwan et al., 1987). This discrepancy could be due to the small and homogeneous samples used in most of the studies, to the measures employed, which could be more sensitive to the way women respond to psychosocial stress, and, also, to the fact that the cause of infertility was not considered as a variable for analysis, although it is established that the person who considers himself/herself as responsible for the inability to have children experiences greater distress than his/her partner (Daniluk, 1997).

6.4 Effect on Couple's Relationship

Most couples report that infertility did affect their marital relationship. Some report that the effect was negative while for others that it was positive (Lalos et al., 1985; Leiblum et al., 1985; Baram et al., 1988). Most report that their sexual relationship deteriorated as a result of infertility, and that they were no longer involved in love-making, but in baby-making (Rosenfeld & Mitchell, 1979; Dennerstein & Morse, 1985; McWhinnie, 1995). Orgasmic dysfunction and inability to have coitus for postcoital examination have also

been reported (Seibel & Taymor, 1988). However, in a few cases infertility has improved the sexual relationship of some couples (Freeman, et al., 1985; Lalos et al., 1985; Leiblum, et al., 1985;) or has not affected it in any way (Wallace, 1985; Downey, et al., 1989). Further, some couples experienced both marital and sexual problems at the time of the diagnosis, but once therapy begun these abated (Raval, et al., 1987).

Infertile couples do not appear to form a homogeneous group. Different life circumstances together with personality characteristics may affect differently the emotional reactions of people (Callan & Hennessey, 1988b; Demyttenaere, et al., 1989). Further, the impact of infertility varies over the life of an individual and over the course of his developmental history. Parameters such as the age of the person, the biological / historical moment of his life, as well as the outcome of the treatment will influence the effect that infertility has on the person affected (Edelmann & Connolly, 1986; Sandelowski, 1993). For example, younger women who are strong believers in a religion that highly values childbearing, and who do not have a close relationship with their partner, will show more emotional disturbance when faced with infertility than other women (McEwan, et al., 1987). The effect of the diagnosis of infertility will also be influenced by the individual's value system, by the parental expectations, as well as by personal views of the parental role (Williams et al., 1977).

In conclusion, as Golombok (1992) states, the impact of infertility on psychological functioning is complex and is influenced by a number of factors such as the stage of the treatment the individual is in at the time of testing, as well as the coping strategies infertile individuals employ in order to cope with the problem.

7. CONCLUSION

The above literature review indicates that infertility can be discussed at different levels: The individual level -- which refers to each member of the couple separately, the couple, the doctor -- the epidemiological level, the ideological and the cultural level adopted from a particular culture at a given moment. Therefore it has medical, psychological and social components.

Fertility has been highly valued by society, and by most individuals, throughout history. Despite the fact that women have entered the working force, maternity still remains their main role. Infertility is a stressful event and is experienced as a loss affecting the greater part of the individuals' lives. However, people vary greatly in their response to infertility because different life experiences, together with different personality characteristics and values, influence the impact of infertility on individuals and couples.

CHAPTER 2

IN-VITRO FERTILISATION AND ITS EFFECT

In this chapter, first the In-Vitro-Fertilisation (IVF) treatment is defined, with an account of the success rates and possible risks of the procedure. Subsequently, the literature concerning the experience of pregnancy when conception occurs naturally is reviewed, and the differences with pregnancy after infertility are discussed. Lastly, studies are examined concerning the effects of IVF on couples, on their offspring, as well as on the quality of parenting.

1. IN-VITRO FERTILISATION DEFINED

Initially, most researchers employed the term "artificial procreation" to describe the methods used to overcome infertility. However, as the word "artificial" has a negative connotation while the term "assisted" is more neutral and describes more accurately the different techniques employed, the terms "assisted reproduction" or "assisted reproductive technology" are currently employed by most people concerned with the management reproduction (Mandofia-Berney & Campana, 1993).

Assisted Reproductive Technology (ART) has given hope to many couples who, in the past, would have no possibility to have children. The procedure of In-Vitro Fertilisation (IVF) was historically the first ART method and is still the method most commonly employed. It was developed as a treatment for infertility caused by mechanical tubal factors which could not be corrected by surgery. During the last years, the method of IVF is used to confront problems which include male infertility, endometriosis, unexplained infertility, and other multiple causes (Leiblum, 1997).

The first human IVF pregnancy was achieved in 1976, and the first IVF baby was born in 1978 (Steptoe & Edwards, 1978). The procedure at the time was

applied to the natural cycle, which meant that no fertility drugs for ovarian stimulation were employed and the woman's normal ovarian follicle was used. At present, as the success rate is higher, the IVF procedure includes stimulation of ovaries with various drug protocols to produce multiple follicles and oocytes. Oocyte retrieval, initially performed with laparoscopy under general anaesthesia, now is performed transvaginally, is ultrasonically guided and requires only local anaesthesia. A successful IVF procedure requires the recovery of mature oocytes with full developmental potential to undergo normal fertilisation. Embryo transfer usually occurs 48 hours after oocyte retrieval. When more embryos than those transferred are available, these can be frozen. In such cases they are then employed in a future IVF attempt, with no fertility drugs required, and the woman undergoes simply the third phase of the IVF procedure and the thawed embryos are placed in her uterus. It is estimated that, since the birth of the first baby, approximately 100,000 infants have been born all over the world as a result of IVF. And world-wide approximately, 1 infant in 200 is conceived outside the body (Bourg, 1996). At present there are variations of the classical IVF procedure. The most important one is the intracytoplasmic sperm injection (ICSI) which is employed in cases of serious sperm problems. The procedure involves the immobilisation of one sperm which is then dragged with a special micro instrument and placed so that it will penetrate the outer coat of the oocyte, where it is injected into the cytoplasm. Once fertilisation occurs, the normal procedure of IVF is followed (Leiblum, 1997). The first four human pregnancies using ICSI were reported by Palermo and associates in 1992.

2. SUCCESS RATES

The effectiveness of IVF is referred to as "success rate", and great confusion exists regarding the current overall IVF pregnancy rate because of the different definitions employed in pregnancy success calculations. Each pregnancy success rate definition includes a numerator that refers to the measure of the number of pregnancies, and a denominator that reports the number of IVF cycles. As stated above, IVF consists of a number of treatment phases -- ovarian stimulation, oocyte retrieval, fertilisation in vitro, embryo transfer -- and each of these phases has been used as a denominator in the definition of a pregnancy success rate. Besides, several definitions have also been used in reporting the presence of a pregnancy. Thus a "biochemical

pregnancy" is present when a rising hormonal level is observed in the woman treated. A "clinical pregnancy" is present when a gestation sac is observed as the woman is examined by an ultrasound. Some researchers do not agree that pregnancies should be used as an indicator, but prefer to count a "take home baby" ,which means a healthy baby taken home after delivery.

An additional problem in estimating the effectiveness of IVF is that during the first phase of ovarian stimulation, a number of women's ovaries do not respond to the stimulation. Some of them as a result, drop out of treatment. Further, some women do not proceed to the embryo transfer phase, either because their oocytes are not fertilised, or because the resulting embryos are not considered of good enough quality for pregnancy to occur. It is estimated that nearly 20% of women face problems during the phase of ovarian stimulation, and approximately another 10% do not reach the embryo transfer stage. Consequently, when the denominator employed uses embryo transfer cycles, women who dropped out of treatment are not considered. This results in the rates being overestimated. It has been estimated, also, that from the treatment cycles that reach the embryo transfer phase, about 20% result in a clinical pregnancy, but the "take home baby" rate per started treatment of IVF is only 10%, because of spontaneous abortion and extra uterine pregnancies (Haan, 1990).

A similar percentage regarding the IVF success rate was announced in an international meeting where the experiences of 58 IVF teams who initiated 9641 IVF treatment cycles were pooled. An overall 13% of viable pregnancy rate per active cycle was tabulated (Assisted Reproductive Technology US & Canada, 1991, 1992). The Society of Assisted Reproductive Technology (1995) which gives annually an account of success rates and differentiates them according to the woman's age provides another percentage. In their last report, in 1993, from 31,900 IVF cycles the success rate for women under the age of 40 was 18.8% per stimulation cycle, while for women over the age of 40 the rate was only 6.7% live-births per attempted stimulation. It is not established whether and how the success rate changes with repeated IVF cycles and thus it is not possible to say after how many unsuccessful IVF cycles a woman should discontinue. In one study it was shown that there is a slight decrease in probability of pregnancy over successive cycles, but the data are not sufficient for safe conclusions to be drawn (Tan et al., 1992).

3. RISKS OF IVF

Certain risks have been associated with the different phases of IVF treatment. These refer to medication risks during the first phase of the treatment, to oocyte retrieval risks during the second phase of the treatment, and to embryo risks during the third phase of the IVF procedure. Besides risks have also been reported regarding pregnancy. The possible risks encountered in each phase of the IVF treatment are discussed below.

3.1 Medication Risks :

Ovarian hyper stimulation syndrome (OHSS) can occur whenever women use ovarian stimulation medications. This complication occurs in less than 1% of women who have an oocyte retrieval with IVF. When severe, this complication can lead to dehydration, large accumulation of fluid in the abdominal and lung cavities, blood clotting disorders and kidney damage (American Society for Reproductive Medicine 12/96).

Other risks, such as multiple pregnancy, ectopic pregnancy, and spontaneous abortion, are also associated with IVF. A number of controversial studies associate ovulation induction -- which often occurs in infertility treatment and is thought of as essential in IVF -- with ovarian cancer. However, although there appears to be an association between the two factors, a causal effect is not evident (Bristow & Karlan, 1996; Mosgaard, et al., 1997).

3.2 Oocyte Retrieval Risks:

Ultrasound-guided transvaginal oocyte retrieval is a procedure whereby a long, thin, needle is passed through the vagina into the ovary. During this procedure women are usually under sedation or local anaesthesia. Organs near the ovaries such as the bladder, the bowel, or even blood vessels, could be injured and require further surgery. Limited bleeding from the ovary may occur, but the need for transfusion is extremely rare. Infections following transvaginal oocyte retrieval are also possible, but infrequent. Laparoscopic oocyte retrieval can be complicated by any of the surgical risks associated with laparoscopy. Major injury to the bladder, bowel, uterus, blood vessels or

other pelvic structures occurs in approximately 1 in 500 -1,000 surgeries (Stephenson, 1993).

3.3 Embryo Transfer Risks:

The transfer of embryos may cause mild irritation to the cervix or uterus.

3.4 Pregnancy Risks:

An increased risk of birth defects in children conceived by IVF does not exist. The proportion of malformation in infants and foetuses is the same for IVF as it is for natural conception. But there is a higher rate of miscarriage after IVF than after natural conception and the figure is estimated at about 15% to 20%. The incidence of ectopic (tubal) pregnancy is a relatively rare condition after natural conception. However the advent of Assisted Reproductive Technology (ART) which refers to all the methods applied in reproduction (i.e. ovulation treatment, IVF, Gift, donor inseminations etc.) has dramatically increased this risk to about 5% to 6% of clinical pregnancies 1 in 20 with ART, compared to about 1 in 80 in the general population. This is considered to be one of the major early complications of ART pregnancies. A history of uterine pathology or surgery is proposed as the cause. It is possible to have a pregnancy both in the fallopian tube and the uterus, although this is highly unusual (Plachot, 1989; Schenker & Ezra, 1994; French in Vitro National, 1995; Tal et al., 1996). The multiple pregnancy rate in ART is estimated from 22% to 29%, whereas in the general population it is only 2.3%. This incidence of multiple births -- twins, triplets, and higher order multiple pregnancies -- has significantly increased as a result of IVF and associated procedures. All forms of fertility treatment that rely on ovarian stimulation are associated with an increase in the number of multiple births. The rate of twins with IVF is one out of four IVF pregnancies, and the rate of triplets or more is approximately 5 percent. Assisted Reproductive Technology contributed 22% to U.S. triplet and higher order births from 1990 to 1991 (Price, 1990, 1992; Wilcox et al., 1996). It has been estimated that from January 1, 1976 to December 31, 1995 in the 3161 twins, and 119 triplets recorded by the East Flanders Prospective Twin Survey (EFPTS), 725 twin births and 97 triplet births were associated with ART (Derom et al., 1987). Multiple pregnancies are complicated by an increased risk of premature labour, maternal morbidity, premature delivery, maternal

haemorrhage, caesarean delivery, pregnancy-induced high blood pressure, and prolonged newborn hospital-stay, compared to singleton gestations (American Society For Reproductive Medicine 12/96). Furthermore, the rate of miscarriage, preterm birth, stillbirth, babies dying within the first month of life, and long term disability are increased with twins, and even more so with triplets (Lieberman, 1996). Once born, twins or triplets often encounter problems in their psychosocial development. It has been found that their language development is delayed, and especially so if they are boys (Bryan, 1996). Furthermore, reading problems are also more frequent between twins (Ibid.).

In order to reduce multiple gestations resulting from ART, most teams recommend limiting the number of embryos transferred to three in standard IVF procedure.

4. THE TRANSITION TO PARENTHOOD

Pregnancy has been considered as a "critical phase" in a woman's life (Benedek, 1970a p. 137). The term implies, according to the ethologists, that it is a period of time which requires both physiological and psychological adaptations and is influenced by present and past conflicts, which need to be resolved so that a new maturational level is attained. Thus, according to Benedek pregnancy represents a developmental phase. Erikson (1959) viewed pregnancy as an important stage in the human development. Bibring (1959) describes pregnancy as a period of crisis which involves serious psychological and bodily changes. Each woman's pregnancy reflects her whole life prior to conception. Her experiences with both her parents, the forces that led her to adapt to these experiences more or less successfully as well as the separation from her mother and father, all influence her adjustment to this new role (Brazelton & Cramer, 1991).

During the nine month period of pregnancy, mothers have the time to contemplate their doubts, fears and ambivalence about the child to come. These feelings are balanced by the important fantasy of the perfect child. A new child is never a total stranger. Parents see in each baby-to-be a possibility of reviving relationships that may have been inactive for years. The feelings contained in these relationships will once more be examined in

an effort to resolve them. One of the important psychological tasks during pregnancy is the working out of the feelings of dependency of future parents on their own parents, which must give way to responsibility. Besides, the expectant couple's one-to-one relationship must evolve at least, into a triangle. From a couple they must become a family. Pregnancy on the one hand brings the couple closer together and on the other may push them apart. Future parents come closer to one-another as they plan for their new child and for their future and they tend to part when the woman shuts her husband out and her whole energy is turned inward (Shereshefsky et al., 1973). The danger of having a defective child occurs in most pregnant women's dreams. In order to overpower such fears and their underlying ambivalence, mothers must mobilise more and more defences: they must begin to idealise the infant, to visualise the baby as perfect and as completely wanted (Brazelton & Cramer, 1991). Morning sickness and other physiological symptoms may serve to express the negative side of maternal ambivalence, while consciously they may be adapting with enthusiasm to their new role.

After the confirmation of pregnancy, the beginning of the embryo's kicking is often the next landmark for the expectant parents. This gives the pregnancy a dimension of reality. The earliest attachment may be said to begin here, for the mother has real experience that there is now a separate being inside her and, therefore, there is the prospect of a relationship. Kicking is the child's first contribution to this relationship. When the mother begins to clearly recognise the life of her foetus, she will unconsciously put herself in its place and identify with it. She may also replay her personal wishes of fusion and symbiosis with her own mother. It is as if -- through the intervention of her unborn child -- the mother can return to the rewarding aspects of her early relationship with her mother and emerge strengthened. This has been compared to the way toddlers go back to their mothers, finding in that contact new energy to pursue their development toward individuation (Mahler et. al., 1975).

Recognition of the father's role helps a mother see the baby as separate from herself. If she remains aware that her pregnancy resulted from an act on the father's part, as well as her own, and ideally, of the father's wish for a child, she will avoid falling prey to the illusion that she alone produced the baby.

Acknowledging the father's role not only helps a mother to-be with the job of separating from the foetus and of differentiating it from her fantasies, but reassures her that she will not be solely responsible for any successes or failures. This can cushion her fears of inadequacy and her anxiety about her new role. A father's attachment to his baby is also influenced by his own experience in childhood (Jessner et al., 1970).

The above discussion is concerned with the transition to parenthood in couples which have never experienced infertility. Below the transition to parenthood in couples which have encountered infertility and have strived to become pregnant is considered.

Clinical experience and reports by infertile individuals suggest that infertility, for most individuals, affects their sense of self, self-esteem, self-confidence and identity and may have consequent effects on marital relationships, friendships and careers. (Olshansky, 1987a, 1987b; Sandelowski, 1987). The analysis of the experience of infertility is important in order to understand the experience of pregnancy after infertility. Pregnancy cannot ensure happiness. And the couples who have been attempting for years to conceive may not have considered that there are also negative aspects to having children. According to Leiblum, the Chinese proverb is relevant *"Beware of what you wish, for you may get it"* (1997, p. 13).

People may have unresolved feelings of loss, anger and grief from the infertility period and these feelings may be translated into anger at the spouse. Clinical evidence suggests that the suffering of the years of treatment may prevent the normal psychological elaboration that usually accompanies a non-medicalised pregnancy, and thus may transform the pregnancy from a "precious" one to a pregnancy at risk (Sandelowski, 1993).

Previously infertile women who become pregnant report feeling "different" from other women. This sense of being different influences their view of themselves as pregnant. Frequently, inherent in the experience of infertility is the confrontation with repeated losses, either through miscarriages or through the prolonged experience of not becoming pregnant month after month. This results in a loss of confidence, and women often feel haunted by

their destiny, fearing that the pregnancy they now have will come to an end (Sandelowski & Pollock, 1986).

Garner (1985) and Shapiro (1986) reported clinical findings that reveal the significant influence of prior infertility on a woman's experience of pregnancy. Concepts such as disbelief, apprehension, euphoria, anxiety, and ambivalence are mentioned in these studies. Salzer (1991) examined the complex feelings experienced by previously infertile pregnant women. These women report that pregnancy is not always accompanied by happiness. They experience joy, but their pregnancy is also accompanied by fear and mistrust.

Glazer (1993) describes five major concerns that couples face when experiencing pregnancy after infertility: They fear that they may lose the pregnancy, they are anxious about the possibility of having a baby with defects, they experience difficulty in becoming obstetrical patients, as opposed to infertility patients, they do not feel either fertile or infertile -- thus feeling they do not belong to any group -- and they are anxious of having a high-risk pregnancy. Sandelowski, (1993, p. 138), regards pregnancy after infertility, as in many ways, a "reversal in the normal transition to parenthood", because couples have already gone through labour before conception. She also reports, in agreement with Glazer, that couples go back and forth between identities of self as infertile and self as expecting parent. This was also reported by Olshansky (1990) who referred to a period during which women try to normalise their pregnancy. They struggle to view themselves as normal pregnant women rather than infertile pregnant women. Lastly, it should be noted that an IVF pregnancy is not the result of the sexual union of the couple. And this requires a form of mourning because mourning, is always required when the project of an infant is not actualised as anticipated (Roegiers, 1994).

The above clinical findings indicate that feelings and experiences that reveal contradictory emotions are intensively present when pregnancy occurs after the experience of infertility. It cannot be specified, however, whether these feelings are present after all treatments of infertility, or only after some specific ones, as whether it takes place only after many years of treatment, or even after short treatments. Moreover, it is not known whether, or not, these

feelings should be attributed to previous miscarriages in the course of their efforts to become pregnant.

Despite these clinical reports most research studies reveal no differences in maternal anxiety during pregnancy in IVF mothers (Reading et al., 1989; Stanton & Golombok, 1993). However, McMahon et al., (1997) did find that IVF couples were exceptionally concerned about childbirth and about separating from their infants after childbirth. Furthermore, Sandelowski states that the persistent psychological effects observed during the infertility period were still present after the pregnancy and even after the delivery of a healthy baby. This, however is not observed in the study by Davis et al., (1992), who, having observed parents after infertility treatment while interacting with their infants at infant's age 7, 21 and 28 days after birth, concluded that infertility did not impair parental behaviour. Still, other research suggests that infants born after a long period of infertility are psychosomatically vulnerable. It has been noted that they suffer particularly from a raised incidence of sleep and nutritional problems (Raoul-Duval et al., 1996).

5. OUTCOME OF PREGNANCIES RESULTING FROM IVF

Women who conceive a child after IVF are usually older than those who conceive "naturally" (average age 33.9 versus 28.8). They have been, on average, infertile for 6.3 years and the most common cause of infertility has been tubal damage. Multiple deliveries are much more common in IVF pregnancies. Normal vaginal delivery occurs in only about 1/3 of births, while the rest are performed by caesarean sections that take place in the absence of any foetal or maternal complications. A high frequency of premature deliveries are also reported which, in part, are related to the high proportion of multiple births. The sex ratio of the infants and malformation rates are similar to those found in "natural" births (Beral et al., 1990; Friedler et al., 1992; Reubinoff, et al., 1997).

6. EFFECTS OF IVF

6.1 On the Couple

"Stephen is the child I have been attempting to conceive for the past seventeen years. Stephen is why Toby and I are involved in the IVF program... (But) Stephen is one of the most deformed babies you will ever hear about. He has a handicap. He has no body...Stephen is waiting inside my mind". Thus reports a woman undergoing IVF treatment.
(Bainbridge, 1982, p.120, In : Sandelowski, 1993, p. 1)

Considering the effects of IVF, it is important to answer two relevant questions: First, whether IVF patients are different in any way from other infertility couples who do not undertake IVF. And, second, whether IVF -- i.e. the treatment per se -- does affect couples and individuals. Many researchers propose that the couples pursuing IVF treatment are the most motivated to procreate.

The child Psychiatrist Luc Roegiers (1994) proposed an interesting theory about IVF patients. He observed that a large number of couples attaining IVF treatment recount extremely painful personal histories, such as death of a parent when they were still young, death of sibling, psychological or physical abuse by parents. He suggests that when such people are confronted with infertility it is logical to suppose that they will try in every possible way to overcome it in order to "amend" their traumatic experiences, while "reliving" childhood through that of their children. Roegiers does not propose that these people axiomatically have experienced more painful childhood than others, but perhaps the calamity of infertility and the mourning required when confronting it may reactivate a painful past. Usually these couples involve themselves mechanically in IVF and ask for attempt after attempt. They often say :

"I have passed 10 years of my life in thinking only about having children. We have not enjoyed any Christmas, holiday or family reunion. Without children life is without one good moment"
(Koeppel, 1992, pp. 29-30)

IVF patients belong to middle or upper socio-economic status. They are more ambitious, creative and independent than other infertility patients (Given, et al., 1985; Mazure & Greenfeld, 1989). According to some studies, infertility diagnosis differentiates participants of IVF programs on a number of psychological variables (Shatford, et al., 1988). For example, patients with tubal and multifactor infertility score higher on measures of abasement than do patients with male factor infertility. No differences were observed in coping, social support, depression and anxiety (ibid.).

The couples themselves when talking about IVF describe the procedure as stressful, producing anxiety and as taking over their entire lives, their thoughts, feelings and conversations (McEwan et al., 1987; Seibel & Taymor, 1988; Cook et al., 1989; Mazure & Greenfeld, 1989; Newton et al., 1990; Papaligoura, 1992; Thiering et al., 1993; Harlowe et al., 1996). It is also reported that men attending an IVF program have a reduction in the quality of their semen compared to pre treatment levels. This reduction is attributed to the stress experienced during the treatment (Harrison et al., 1986).

The psychological effect of IVF failure has also been studied in a number of studies. These studies conclude that the effect of IVF failure is varied, with some couples coping adequately while others appearing more vulnerable (Newton et al., 1990). Furthermore, most researchers agree that the first failed cycle in IVF treatment is the most traumatic for most couples (Boivin et al., 1995; Leiblum et al., 1987; Papaligoura, 1992)

6.2 On the Infants

Research on the effects of IVF on infants is limited. Accounts on IVF have considered moral and judicial issues, but have not extensively focused on the development of the children born out of these reproductive techniques. Blyth (1990) states that the debate over the last few years has taken little account of the interests of the children to be created by the assisted reproduction techniques, and considerably more effort has gone into questioning the morality of storing and experimenting with embryos, than on the future prospects of live children.

All assisted reproductive techniques share the following characteristics: first, they are preceded by a period of infertility; and second, they are not therapeutic methods in the sense that they do not cure the infertility problem. The couple cannot have another baby unless they are treated again. As a result, feelings of shame, culpability and inferiority may continue even after the infant is born. This may lead the mother to find it difficult to see this child as a" person " and could lead her to see the baby as the" bad object", or cause of the sufferance and preoccupation of all the years of trying. A third characteristic of these methods is that they separate the sexual act from reproduction, since sexual intercourse is not required for reproduction. The desire to become pregnant may assign to procreation more importance than to the sexual act. Certain couples give the impression of having abandoned their erotic desire and sacrificed it for procreation. They invest in their IVF attempts, and become the future parents without infants and without sexual pleasure (Koeppel, 1992). Furthermore, the separation of sexual intercourse from procreation could be associated with an alienation of the father from the whole conception (Delaisi de Parseval & Janaud, 1983). According to Golombok (1992), this alienation of the father from conception is characteristic of assisted reproduction.

Another potential complication of IVF is the hypermedicalisation of the treatment which could increase the anxiety of future parents and, as a result, increase their overprotection when they become parents (Delaisi de Parseval & Janaud, 1983). Finally, a possible risk of the assisted reproductive methods, is that as the couple concentrates on the effort to reproduce, any problems in their relationship can be denied and risk coming to surface once the infant is born, or even projected onto the infant. Regarding the treatment of IVF-ET as such, it is characterised as stressful, requiring a great amount of emotional energy. Clinicians view with scepticism experiences which require a great abundance of effort i.e. experiences that demand too much "heroism". The moment of embryo transfer is psychologically of great importance for the women "transferred", since this leads many of them to "feel" already pregnant. They know that one or more embryos have been implanted inside them and they may feel that the doctors have fulfilled their task, and now success is their own responsibility. This belief is, sometimes, strengthened by the behaviour of doctors themselves (Papaligoura, 1992). Consequently, if the menstrual cycle returns, the sentiments of culpability experienced by a

number of women may be intense. Furthermore, the most difficult phase of the whole treatment is reported, by most women, to be the period after the embryo transfer and until the day of the test required to establish the presence or absence of pregnancy (Leiblum et al., 1987; Papaligoura, 1992). A number of researchers report that the overprotection of infants by their IVF parents could place them at risk for social or emotional problems (Golombok, 1992). In terms of interaction, the association reported earlier between years of infertility of parents and subsequent psychosomatic troubles in infants, has been explained on the basis of difficulties encountered by parents. Such difficulties are of the type "autonomy-dependence" of the infant on the mother. Mothers have been described as having an attitude defined. as " anxious solicitude" or "anxious hyperinvestment" , which refers to a mother stimulating and caring for her infant, but at the same time not letting the child have enough space and time to achieve its autonomy (Colpin & Manuel, 1996).

As for the children, the knowledge that they were so desperately desired may make them feel compelled not to let their parents down, as they try to live up to parental expectations. This may prove to be a heavy burden for them, especially if they remain only children. According to Pasini (1983), the most fortunate children are those who were desired by their parents but who were not absolutely indispensable for them.

One of the first studies regarding the development of IVF infants was conducted by a group of Australian child psychiatrists (Mushin et al., 1986). The 33 infants studied were between 12 and 37 months old and their psychosocial development was assessed through tests (Bayley Scales of Infant Development) and interviews. The results indicated that the development of the children was within the normal range. Whenever problems were observed these were attributed to the low birth weight of these children. In another study conducted by Yovitch et al. (1986) 20 IVF infants aged 1 year old were given a developmental test (Griffiths Developmental Scale). The results indicated that the scores of IVF infants were within the normal range. Anne Raoul-Duval et al., (1996) studied 33 couples, parents and infants born after IVF, and compared them to two groups. The first group included parents and infants who had experienced infertility but not IVF, while the second group consisted of parents with

infants naturally conceived. The three groups were visited just after birth, then again at infant age 9, 18 and 36 months. They were given a questionnaire and were observed when interacting with their infants to assess the way they spoke and breast fed them. The results indicated that IVF mothers had perceived their pregnancies as difficult and at risk without any pathology justifying this perception. Furthermore, the researchers also observed more problems regarding the communication of these mothers with their newborn infants (24% IVF; 21% INF; 15% Control), whereas maternal depression was more often observed in mothers in the infertility group (15% IVF; 21% INF; 15% Control). At 9 months after birth, more IVF infants had feeding problems (16%, IVF; 6% INF; 0% Control) and sleeping problems (39% IVF; 29% INF; 3% Control). Furthermore, IVF mothers were more depressive than the mothers in the other two groups. By 18 months the difficulties in feeding and sleeping continued in the IVF group but to a lesser degree, and by 36 months the differences had disappeared. However, none of the observed differences reached statistical significance, and the researchers conclude that the psycho-social development of IVF infants is normal.

Golombok and associates (1990), in a pilot study, examined 26 children born after IVF when they were between 2 years 8 months and 5 years old. The children were given one test (Schedule of Growing Skills) to assess their developmental progress, another test (Pre-School Behaviour Checklist) to assess any behavioural or emotional problems, and a third (Pre-School Activities Inventory) to assess sex role behaviour. The results indicated that the majority of the IVF children studied performed above their chronological age. IVF boys, however, showed more behavioural and emotional problems. The researchers concluded that it is not possible to draw safe conclusions regarding the social and emotional development of children born after IVF because the sample was too small. In a subsequent study (Golombok et al., 1995, 1996), a large number of children born from IVF and other assisted reproduction methods were observed. The researchers concluded that the children's emotions, behaviour and relationships did not differ from controls. In an analogous study, McWhinnie (1995), employing in-depth, non-directive interviews, visited 54 families. In these families, 74 children were the result of assisted reproduction and 43 had been conceived through IVF. In all cases the children were reported to be developing well.

6.3 On Quality of Parenting

Maternal sensitivity was assessed by McMahon et al., (1997) who observed 70 IVF mothers interacting with their infants in a structured situation. The researchers concluded that IVF mothers were more anxious regarding the survival and health of their infants, that they had lower self-efficacy as mothers and that they rated their infants as significantly more difficult than controls. However, their maternal sensitivity, attachment to infants and satisfaction with parenting did not differ from that of control mothers. The authors suggest that the low self-esteem of IVF mothers could be an indication of unresolved feelings of infertility. Gibson et al. (1996), in comparing 70 IVF primiparous women and their 1 year old infants to 63 matched controls, found no group differences in the quality of attachment. However, IVF mothers reported higher levels of separation anxiety and rated their infants as more irritable, more active and with more mood reactions. Similarly, Weaver et al. (1993) report that IVF parents considered themselves as overprotective. In a study conducted by Golombok and her associates (1995) to assess the quality of the marital relationship, the amount of anxiety and depression, as well as the quality of parenting in families created by assisted reproduction, 41 families with a child conceived by IVF, 45 families with a child conceived by Donor Insemination (DI), 43 families with a "naturally" conceived child and 55 families with an adopted child were examined. All children were between 4 and 8 years of age at the time of the study. All parents were given questionnaires, standardised tests and interviews. The results indicated that parents with naturally conceived children had higher levels of anxiety and depression.

Regarding the quality of parenting, the results showed that mothers of children conceived through IVF, DI or who were adopted were more warm and showed more involvement toward their child than control mothers. The researchers conclude that families from assisted reproduction function extremely well, and interpreting their findings, suggest that these parents are probably more committed to parenting. Similar results were presented when the study was extended to include subjects from the U.K., Spain, Italy and The Netherlands (Golombok, et al., 1996). Analogous findings regarding quality of parenting are reported by Balen, (1996a, 1996b) but only for

mothers. Fathers, however, of children conceived by assisted reproduction did not interact with their children more than control fathers. No differences on IVF parents were found by Colpin et al. (1995). McWhinnie (1995), who studied 54 families, reports that the parents described themselves as being protective or overprotective of the children. Most parents were concerned about their children being only children, about being seen by others as unusual and about their irritation when their children are referred to as the "test-tube babies". Regarding secrecy, 4 of the 31 families had kept their involvement in IVF a secret, while for the rest, the level of secrecy varied. Fathers reported that they were excluded from the whole treatment and that some of them experienced difficulty in providing the semen. The issue of secrecy has been studied in a recent study and the results indicated a greater openness regarding IVF with 94% of the IVF parents in favour of telling the child about the method of conception (Brewaeys et al., 1997).

Quality of parenting, was assessed in one study with questionnaires, standardised tests and observational methods. The 70 IVF mothers examined were compared to 63 control mothers who had conceived "naturally". All mothers were interviewed and given a questionnaire during the 30th week of pregnancy, and again when the infants were 4 months old. During the second visit all mothers were videotaped and maternal sensitivity was assessed with the Still-Face procedure developed in the in the U.S.A by Tronick (et al., 1978), and in the U.K. by Lynne Murray (1980) at the University of Edinburgh. The results indicated that IVF mothers were more anxious regarding the survival and health of their infants during pregnancy. Postnatally they reported feeling less competent than control mothers, and rated their infants as more difficult. Maternal sensitivity did not show any group differences (McMahon et al., 1996).

7. CONCLUSIONS

The above studies allow the following conclusions to be drawn: Children conceived through IVF apparently develop normally. Only a few studies report some feeding and sleeping difficulties, together with some difficulty in interaction between mothers and their newborn infants. Regarding quality of parenting, some studies suggest that IVF parents do not differ from those who become parents "naturally". Nevertheless, a number of studies find that

IVF parents are more anxious regarding the well-being of their children and they tend to be overprotective. Other studies report that IVF parents may become "better" parents (meaning that these parents are warmer, more attentive and sympathetic) from those that conceive their infants "naturally". These findings become hypotheses to be tested in the present research.

CHAPTER 3

INFANT COMMUNICATION

The classical theories regarding infant development are briefly presented, followed by a review of changes in developmental psychology that have led to a different evaluation of neonates and their communicative capacities. This account of the literature on assessment of typical infant-caretaker communication is followed by a discussion of atypical interactions.

1. THEORIES REGARDING EARLY INFANT DEVELOPMENT

1.1 Classical Psychoanalytic theory : Psychosexual development in early infancy

The foundation of the psychonanalytic interpretation of infancy is in the 19th century a medical theory of the infant as an immature biological organism.

According to Freud, the instincts represent the motive forces which drive the nervous system to develop. The aim of any instinct is satisfaction, and the object of an instinct, which can be either external or internal, is that thing through which the instinct is competent to achieve its aim. The psychological or biological sources of an instinct are the different somatic parts that are represented in the central nervous system at different stages of development. The excitation of different parts of the body at different ages produces sexual pleasure which Freud identified with sexual gratification.

The areas of the body on which erotic or sexual pleasure is concentrated were called by Freud the "erotogenic zones" (Freud, 1905, p. 175). On the basis of supposed changes in these active zones the respective names to the stages of development were given. Thus, according to the original psychoanalytic theory, during the first year of life infants go through the *oral stage* of development. The erotogeneous zone at this stage is the mouth, and

pleasure comes from excitation of lips and tongue and from activities such as sucking, chewing and swallowing.

Initially the pleasure seeking sexual activity attaches itself to one of the vital functions ensuring self-preservation. The first object of the oral component is the mother's breast which satisfies the infant's need for food. Later, oral satisfaction becomes detached from the need for food, and infants are satisfied by sucking a part of their own body e.g. their thumb. As the instinct is at first directed inwards, this period is called "auto-erotic". (Freud, 1905, p. 97). For the auto-erotic period the external world is irrelevant. This is the period of "primary narcissism" before the development of the *ego*, which, according to Freud's theory, is not present in the neonatal period. Development of the ego coincides with the departure from primary narcissism in which the psychic life of infants is said to be dominated by the pleasure principle, and the main purpose of the infant's mental activity is directed toward obtaining pleasure from contact with the mother and breast feeding

1.2 Melanie Klein

Melanie Klein (1975), differentiated her theory from that of Freud by claiming that the *ego* is present at birth, and that the development of the *superego* takes place before the 5th month. She proposed the early stages of the Oedipus conflict, which Freud placed in the toddler period, are founded during the first year of life. According to Klein's theory, the infant establishes *object relations* from the beginning. The first object is the mother's breast which is distinguished, according to how it is experienced, as the "good" or the "bad" breast.

Klein, attempting to find developmental precursors of adult psychotic states, distinguishes between the "paranoid-schizoid" position, which extends from the 1st-4th month, and the "depressive position" around the 5th month. From the first week of the infant's life the mother represents for him or for her the outside world -- both the bad and the good world. In the first experiences with the mother the infant builds the first "partial object". The relation with the maternal breast is entangled both with libidinal (positive) and aggressive (negative) instincts manifested, respectively, in sucking and biting).

1.3 Mahler's theory for infant psychosocial development

According to Mahler, who made systematic observations of infants after she had established her work in the U.S., psychosexual development in infants goes through a number of stages. During the first weeks of life the infant moves from sleeping to wakening states and physiological processes dominate his/her existence. She named this stage "normal autism" because at this period satisfaction of needs comes from the infant's own "omnipotent autistic orbit" (Mahler et al., 1975, p. 42). The infant is not aware of the mother's presence. Gradually, however, with maternal care, the infant acquires a vague awareness that his/her needs cannot be fulfilled by himself or herself alone, but that satisfaction comes from somewhere outside. The task of this phase, according to Mahler, is the achievement of homeostatic equilibrium in interaction with the outside world.

At the beginning of the 2nd month the infant differentiates between pleasurable and painful sensory experiences and begins to realise that satisfaction of need comes with maternal intervention. This phase is called the "normal symbiotic phase" and extends from 2 to 4 months. The infant turns libidinally toward the mother and behaves as if he/she and his/her mother constitute a dual unity in a system with common boundaries. The eye-to-eye contact is considered to be the releaser of the social smile, which in turn marks the entrance into a need-satisfying object relationship. The charge of mental energy attached to the mother (cathexis) is the principal accomplishment of this phase.

At the peak of the symbiotic phase, i.e. around the 4^{th} to 5^{th} month, the "separation-individuation" phase begins. The smile which up to now was unspecified becomes specific to the mother and this is the indication that a bond has been established between the mother and her infant. The infant's attention is no longer focused inwardly but now gradually expands and more memories of the mother's comings and goings are stored. The infants, during this phase, appear to be more alert and persistent, and their behaviour is more goal-directed. Mahler described the infants in this separation- individuation phase as becoming "hatched" (ibid. p. 54).

..."It is the specific unconscious need of the mother that activates out of the infant's infinite potentialities, those in particular that create for each mother "the child" who reflects her own *unique* and individual needs. This process takes place, of course, within the range of the child's innate endowments" (ibid., p. 60).

The preceding theories, while gradually granting the infant more psychic structure in early stages, view the infant as initially being in a diffused state, dominated by physiological experiences, not being in a position to differentiate between self and others. This implies that the young infant's communicative behaviour is also diffuse, and its role in a dyadic interaction is unimportant

"sustained only through the mother's initiative in replying to the infant's responses *as if* they had communicative significance" (Schaffer, 1977, p. 10).

Around the 70's, following detailed examination of how infants actually respond to their mother in natural circumstances, including playful engagements outside the feeding situation, a drastic change occurred in developmental psychology. The first relationship between the mother and the infant became the focus of many studies, and many functions were identified that could not be understood solely by consideration of the psychological organisation of the infant as a biological individual. The newly discovered behaviours had to be examined in an interpersonal level as researchers began to study the first social relationship that the infant formed. This new emphasis on dyadic relationships was facilitated by the availability of inexpensive video equipment which made possible the widespread application of microanalytic techniques in the study of infant-caretaker interaction. A completely new picture emerged regarding neonatal capacities and the earlier theories regarding infant development were questioned and found wanting (Schaffer, 1977; Bullowa, 1979).

2. NEONATAL CAPACITIES

The application of films, videos and microanalytic procedures in developmental psychology from the late 60's made possible the close

observation of infants, of their caretakers and of their interactions. Trevarthen began filming mothers and infants in 1968 with Brazelton, Bruner and Richards at Harvard University. Placing a mirror in such a way that allowed filming of both mothers and infants simultaneously, they clearly distinguished the expressions of both partners. At about the same time Bateson (1979) presented her detailed analyses of mother and infant interactions. In her pioneering work she identified the resemblances between adult conversation and infant prelinguistic interaction. She introduced the term "protoconversations" to describe those behaviours exhibited by the members of the dyad which strongly resemble the characteristics of the non-verbal components of adult conversation. In the last 30 years the extremely rich communication that exists, even during the first weeks of the infant's lives, has been revealed (Trevarthen, 1977; Brazelton, 1979; Bullowa, 1979; Tronick et al., 1979; Trevarthen, 1979) and with this new knowledge came the realisation that infants are much more competent social individuals than any researcher imagined till then, whose emotional expressions are :

"the direct output of their inevitable state of mind in those circumstances" (Trevarthen, 1982, p. 84).

The basic social signals of infants before language are "looking", "facial expressions", "prespeech movements", "simple vocalisations" and "gestures". During early neonatal life the infants have control over their visual behaviour i.e. looking at, looking away, closing eyes or turning head away, which enable them to control the amount of visual input they desire (Robson, 1967; Stern, 1974).

Neonates prefer the human face. It has been reported that infants only 12-36 hours old produce more sucking responses while viewing their mother's image on videotape, as opposed to a stranger's image (Walton et al., 1992). Immediately after birth, they show preference for their mother's voice (DeCasper & Fifer, 1980) and at one month infants suck a dummy to produce her voice, only if the intonation is normal (Mehler et al., 1978). They display facial expressions which indicate emotions such as happiness, sadness, surprise, interest, disgust, anger and fear (Oster, 1978 ; Ekman & Oster, 1979; Trevarthen, 1993a) and even infants only 1 day old can

discriminate between different facial expressions such as sad, happy and surprised (Field et al., 1982). They have the ability to imitate a wide range of facial and vocal expressions, as well as gestural movements and these imitations, do seem to be, not reflexive as Piaget (1962), proposed, but intentional and responsive in reciprocal communication (Field et al., 1982; Maratos, 1982; Field, 1983; Kugiumutzakis, 1985, 1993).
Newborns have well-developed the senses of taste and smell and make facial expressions similar to those of adults when tasting sweet, sour or bitter liquids (Rosenstein & Oster, 1988). Regarding their ability to differentiate between odours, newborns orient toward the odour of their own mother's breast pad, but not toward one from an unfamiliar nursing mother (McFarlane, 1975). By the age of 2 weeks, when picked up in silence and in the dark by an unknown woman, their head, neck and body do not relax as they do when picked up by their mother (Widmer-Robert Tissot, 1981).

These findings disprove the theories which view the infants as merely expressing drives to regulate their body states, and cast doubt upon the view that emotions emerge as a consequence of cognitive development qualifying simple basic need states. According to Trevarthen, these findings show that there are innate mental systems in the brain, specifically adapted for regulating" intersubjective engagements between communicating persons" (Trevarthen, 1990b, p. 97).

3. CURRENT THEORIES REGARDING INFANT DEVELOPMENT

3.1 Trevarthen's "Primary Intersubjectivity"

Trevarthen describes the infant as going through a number of phases of communicative competency. During the first phase -- the neonatal -- infants show only occasional visual exploration and face regard, and smile rarely. During this period the infant's communication with parent, while it is already differentiated, as shown by neonate imitations, is often interrupted by expressions of need for care. The second phase -- "Primary Intersubjectivity" begins at around 5 weeks and extends to about 10 weeks (Trevarthen 1977, 1979, 1980a). During this period infants have a responsive smile, they show pre-speech movements, gestures and coos which are pleasurable or non-

crying vocalisations. They employ intent eye-to-eye contact and engage in reciprocal protoconversations. Intersubjectivity, as articulated by Trevarthen, refers to the mutual sharing of psychic states animated by intentions and motives that seek particular experiences or "objects", including responsive human partners.

The observation of infants engaged in communication with others during this "Primary Intersubjectivity" period shows the presence and functions of emotions. Infants focus on the parent's face and voice. They make eye-contact from 6 weeks and smile from about 6 to 8 weeks. They also "coo". Coos appear along with smiling and although at first they are weak, during the second month they become strong and clear. Infants also show fretting, grimacing and crying, which together with different postures and gestures reveal a coordinated display of changing feelings that may interact immediately with the affect in a partner's expressions. "Happy communications" between affectionate and responsive mothers and their 2-month-old babies show coordinated action with synchronisation between the expressive movements of the two subjects (Trevarthen, 1979, p. 334) . The efficient coordination between adults and infants in protoconversations prove that both members of the dyad are equipped to "take account " of the other (Trevarthen & Aitken, 1994, p. 603). Trevarthen believes that infant motives for communication are innate and that the abilities of infants show that neonates come into the world prepared specifically to communicate with people (Trevarthen, 1982). He states that:

"Communication is more than achieving a set of skills - it is about taking one's place in the world of humans where there is a shared emotional understanding between individuals. Communicative exchanges provide an effective means of expressing love, hate, frustration, anger, happiness, sadness and for providing an understanding that these expressions are noticed and understood by other individuals. They are a fundamental part of human life and development"
(Trevarthen 1993a, p.159).

According to Trevarthen a differentiation between self and other is present from birth, and a "more assertive more conscious self " develops during the

first months after birth while the innate ability to communicate also rapidly develops during the first months of life (Trevarthen, 1993a, p. 161) .

The next phase of development, according to this theory, extends from around 10 weeks to about 20 weeks. Initially during this period protoconversations are often interrupted by the infant's alert focus on objects or events. The infant withdraws from eye contact with the mother, watches the mouth and hands, regards objects, accommodates to object motion and reaches to grasp; there is active visual exploration of the surroundings. Mothers at this period, responding to the infants new curiosity and animation are playful, mildly teasing, and infant-mother games are lively while infant-mother-object games are still gentle. At 21 weeks play becomes vigorous, the infant laughs and may be "shy" (Trevarthen, 1982; Reddy, 1991).

The importance of early communication for healthy emotional development of infants was also recognised by the Psychoanalytic theory. Trevarthen, (1990b), however, believes that emotions are important not only for the infant's emotional well-being but also for the development of the child's consciousness of meaning which is achieved during early communication within partnerships, which are regulated by the expression of emotions. Furthermore, he states :

" the image of the newborn needing "socialisation" to become a person resembles a superstition, or at least a one-sided view, too concerned with organic maintenance, modulation of arousal, emotional defences, and instruction in skills and knowledge" (Trevarthen, to be published, p. 2)

3.2 D. Stern: The sense of Core Self and of the Emerging Self

From birth to about 2 months infants have what Stern calls a" sense of the core self", which is a physical self that operates outside of awareness. It is not a solely sensorimotor entity because it does include affective features. However, the observation of neonate imitation, especially the give-and-take of imitations, call this idea into question. Evidently, even neonates have some self-other sense, and it is effective in interaction. During this time, according to Stern, the infant experiences the process of the" emergent sense of self" which refers both to the process and to the result of an emerging

organisation or of a form of learning about the relations between the infant's sensory experiences. Around the age of 2-3 months important changes are noted. Infants approach social interactions with an organised perspective implying that they have an integrated sense of themselves, that they experience others as distinct and separate people. Their interpersonal relationships help them regulate their experience. During this period the feelings and intentions of each partner in the dyad become the goal of the interaction (Stern, 1985, p. 45).

Stern employs the term "affect attunement" (Stern, 1985, p. 138) which is similar to Trevarthen's term of "intersubjectivity". The difference lies in that "intersubjectivity" refers mainly to motives and intentions while "affect attunement" to the qualities of feelings and affects and, more importantly, in that intersubjectivity is a two-way process whereas affect attunement is a one-way process, mainly from the mother to the infant.

Despite differences between Trevarthen's and Stern's theories, they both hold that the infant is motivated from birth to take initiatives in the first social interaction and that there is a self at birth.

4. ASSESSMENT OF TYPICAL INTERACTIONS

Study of interactions in early infancy gives important evidence on the factors affecting development. It is widely accepted that the quality of mothering can affect subsequent social relationships. Today, moreover it has been shown that deficiencies of mothering can also affect the infant's body development and, more significantly, early brain development. Premature infants that have contact with their parents who hold and caress them achieve the appropriate body weight that allows them to leave the hospital and return to their homes earlier than infants who do not have this body contact with their parents (Schanberg & Field, 1987). Maternal body warmth also affects the infant's neuroendocrine system, maternal touch affects the production of the growth hormone, and maternal milk affects heart rate (Tronick & Weinberg, 1997). Regarding the effect of interactions on the brain impressive studies show that maternal touch in infancy affects the

growth and extension of hippocampal cells in the infant's brain, which in turn are associated with memory retention in ageing (Schore, 1994).

Important developments which occur at infant age 2 months affect the quality of mother-infant face-to-face interaction. Around this age, infants, as a result of neuromotor maturation, control their head position, experience changes in their visual perception and their cognitive organisation, whereas fussiness, which is characteristic in the neonatal period, declines. Play at this early age refers to mutual exchanges of smiles, coos and gazes between infant-caretaker (Trevarthen, 1977; Papousek & Papousek, 1984). During parent-infant interactions, the adults, without conscious monitoring, employ behaviours such as exaggerated facial expressions, high pitch tone in speech, i.e. behaviours that are particularly appealing to infants.

These behaviours are universal, they have been named "intuitive parenting" (Papousek & Papousek, 1984) and had escaped scientific attention until microanalytic methods were applied because parents apply them without conscious awareness. An interesting example indicating the absence of parental awareness, is that mothers observe their newborn infants when these are asleep from a distance of 40 - 50 cm, but as soon as the infants wake up mothers adjust their distance and position themselves at the centre of the infant's visual field so that the infants can see them clearly. This behaviour is observed even in mothers who report that newborns cannot see (Schoetzau & Papousek, 1977, In : Papousek & Papousek, 1997).

Maternal gazes to infants have been reported to be extraordinarily long compared to average adult gaze exchanges. Mutual gazes between mothers and infants often last as long as 30 seconds -- a period rarely found between adults. Such long mutual gazes are only found between lovers and between people that are about to fight (Stern, 1974). Further, mothers spend nearly 100% of their time during face-to-face interaction looking at their infants. Infants, on the other hand, produce facial expressions similar to those of adults and these are considered to be reflections of understandable internal states (Trevarthen, 1986; Izard & Malatesta, 1987). At 6 weeks, infants can turn their heads and gaze away (Brazelton et al., 1974; Stern, 1985), they can look attentively to the mother's face, they can make syllable-like

vocalisations, "coos", lip and tongue movements, "prespeech" and their active gestures accompany the different emotions they experience (Trevarthen, 1993a).

As mentioned earlier micro-descriptive research into mother-infant interaction began with the classic observations of Bateson (1971, 1975) and Trevarthen (1974). Face-to-face interactions of mothers and infants aged from 2 to 20 weeks old were filmed and the occurrence of 18 behaviours for the mother and 19 for the infant were coded on a second-by second interval. Subsequently, many researchers observed and systematically described infant-caretaker interactions (Fogel, 1977; Newson, 1977; Papousek and Papousek, 1977; Paulby, 1977 ; Stern et al., 1977; Bullowa, 1979; Brazelton, 1979; Chappell & Sander, 1979). In seeking to describe the interactions of infants during their first months of life terms such as reciprocal or synchronous were employed.

Mother-infant interaction has been viewed by many researchers as a dialogue. Bateson named it "protoconversation". These dialogic elements have been observed in vocalisations (Stern, et al., 1975; Bateson, 1979), in gaze (Stern, 1971; 1974) in both verbal and visual behaviours and in kinetic behaviours (Bakeman & Brown, 1977; Beebe et al., 1985). Mother's also perceive their interactions with their infants as having a conversation-like form and often say "Oh that is a nice story you are telling me" or "What is it you are saying?" (Murray, 1988, p. 169).

Initially it was thought that "good" mother-infant interactions were characterised by large proportions of shared positive affect -- that infants did experience some negative affect, but mothers rarely did so, and thus negative affect states were not shared. Mothers, responded to their infants' signals in such a sensitive manner that both partners moved like dancers simultaneously changing interactive states, creating an interaction characterised by positive affect, reciprocity, synchrony, and attunement (Brazelton, et al., 1974; Stern, 1977; Beebe, et al., 1982). Several researchers subsequently attempted to find the degree to which infant-caretaker were in coordinated states. The results varied because of the different definition employed in what was considered as being "coordinated" -- single

behaviours or clusters of behaviours -- and according to whether coordination was defined as a theoretical construct or rather as a quantitative variable (Stern, 1971; Condon & Sander, 1974; Peery & Stern, 1976; Bakeman & Brown, 1977; Fogel, 1977; Beebe & Gertsman, 1980; Kaye & Fogel, 1980; Tronick et al., 1980; Dowd & Tronick, 1986; Cohn & Tronick, 1987).

Tronick and his associates introduced, in 1980, a system for analysing infant-adult face-to-face interactions. This system used, as its basic constituent unit of analysis, sets of combinations of expressive behaviours which were called Monadic Phases and attempted to describe infant-adult face-to-face interaction. Single behaviours may not capture the quality of an interaction, as one behaviour can be substituted by another while attempting to achieve the same goal in the interaction (Brazelton et al., 1974; Bakeman & Brown, 1977). Tronick segmented the interaction into constituent units of behaviour separating expressive modalities of face, voice, head, and eye orientation, as well as body posture, and specific gestures. The segmentation followed the Darwinian "principle of antithesis" (1965) which states that opposite emotions are expressed by opposite behaviours. For example, the infant, when playing sits up straight, raises his/her head and smiles. In contrast, the protesting infant looks away, turns body and head away and "drops" his/her face into a frown or pout. Tronick and his associates, categorised each behaviour as it occurred on a second by second basis from the videotape. Subsequently they transformed the combinations of expressive behaviours into Monadic Phases which were considered as the structural units of the interaction. The analysis of the interaction was then carried out by counting and measuring the duration of these monadic phases (Tronick, 1980).

In subsequent studies, Cohn and Tronick, by analysing mother-infant interactions (1987), depicted a less idealised picture than was at first presented by researchers. They argued that infants and mothers spend only about 30% of their time in synchronous or matching states; that there are modest proportions of negative affect expressed by the infant which are occasionally shared by the mother; that changes in the affect and behaviours of mothers and infants are non-simultaneous and bi-directional with both partners responding to each other's communicative signals (Cohn & Tronick,

1988). Supportive evidence for the above view comes from recent research which shows gender differences in the affective regulatory behaviours of normal 6-month-old infants as well as differences in interactive coherence. Weinberg, has found that infant boys are more emotionally reactive than girls. Thus, gender differences in interactive behaviours show the variants in interactions (Tronick & Weinberg, 1997). According to Weinberg & Tronick (1996) the typical mother-infant interaction moves from coordinated to mis-coordinated states and back again over a wide affective range. The mis-coordinated states are referred to as "normal interactive errors" and the transition from the miscoordinated states to coordinated states as "repairs". With the accumulation of successful reparations and transformations of negative affect into positive affect the infant establishes a positive affective core (Emde, 1983) and learns that he or she has control over social interactions. Other researchers have also described normal mother-infant interactions as moving between coordinated to miscoordinated states (Beebe & Lachman, 1988).

Regression periods during which infants are more difficult and demanding than ordinarily have also been reported to occur regularly from about 5 weeks during "normal" communication between infant-caretaker. It was found that ten such periods occurred in different cases at surprisingly similar ages (PLooij & Plooij, 1993). These periods are characterised by increased fussing, by enhanced demands for body contact, decrease in amount of sleep and in food intake. A common feature of these periods is parent-infant conflict. However it has been suggested that regressive periods have positive consequences on infant development because the adult at this time supports and stimulates the infant which in turn acquires new ways of behaving, and is thus led to a new level of independence. Difficult periods during the first 20 weeks of life have been found to occur at 5, 8 12 and 17 weeks (PLooij & Plooij, 1993).

A more accurate description of "normal" infant-caretaker interaction would be that the interaction repeatedly moves from mutually coordinated states to miscoordinated ones. In "abnormal" interactions there are few periods of coordinated mutually positive periods. The infant experiences long periods

of interactive failure and negative affect, and few interactive repairs (Giannino & Tronick, 1988).

5. ASSESSMENT OF ATYPICAL INTERACTIONS

A number of experiments have been designed to examine the normal infant's response to transitory disturbance of infant-caretaker interactions. The most important of these are the artificial perturbation studies.

5.1 Perturbation Studies

When adults are unresponsive to the infants, then communication is not satisfactory and the infants even at 2 months of age become avoidant, or aggressive, while their facial expressions show distress with yawning, grimacing and frowning. This was clearly shown in experiments where maternal behaviour was manipulated experimentally and the mother was instructed to be unresponsive to her infant, to have a "blank face", to sit still and keep silent. The infants at first attempted to communicate exhibiting negative affect and active gesturing, in a protesting manner. When the mother, as instructed by the researcher, continued to be unresponsive the infants ceased to attempt to make the mother responsive and became avoidant and withdrawn. These infants were characteristically unhappy and distressed and the behaviours they exhibited were gaze avoidance, jerky body movements, protesting vocalisations, absence of smiles, frowning, yawning, pouting, grimacing, hand sucking (Tronick et al., 1978; Murray & Trevarthen, 1985)

In a further condition, the mother was instructed to stop communicating with the infant and turn to speak to another adult. In these circumstances the infants, 6 - 12 weeks old, did not become distressed. They ceased to show the active engagement they were previously having with their mother and simply watched the mother and the other person (Murray, 1980; Murray & Trevarthen, 1985).

In a third test of the regulation of mother infant interaction mother and infant communicated through a closed-circuit television system called the double-

video in which each partner of the dyad saw a full face video image of the other (Murray & Trevarthen, 1985). The system was designed in such a way as to allow for changes in the timing of the display of one partner to the other. The behaviour of the mother was either played as it occurred in real time or with a 30 sec. delay or replay. In the replay condition the baby saw the mother communicating but not responsive to the baby's actual behaviour. During the normal double video interaction the infants exhibited the typical behaviours of infants in happy interactions, i.e. eye contact, smiling, active tongue movements. However, in the delayed or replay condition the infants turned away from the image of the mother, showed frowning, grimacing and yawning , touched their face and clothes and, in short, appeared distressed. In a final experiment the above conditions were repeated but this time the TV replay perturbation was experienced by the mother. Maternal behaviour was analysed and compared in both conditions. In the live sequences maternal behaviour was characteristic of that exhibited by mothers during "happy communication". By contrast, in the perturbed sequence the pattern of maternal behaviour changed and did not have the characteristic "motherese" features. Mothers varied in their responses, but all were disturbed.

These perturbation experiments allow the conclusions that even infants aged 6 weeks old are sensitive to the quality of adult interaction, and that the quality of maternal behaviour depends on the responsiveness of the infant.

5.2 Maternal Depression

Atypical relationships have also been examined in mother-infant communication when the mother is suffering from depression. The results indicate a significant impact of maternal depression on infant development (Murray, 1992). Depressed mothers show communicative deficiencies, such as, reduction in eye contact and slower speech rate, which are precisely the behaviours that infants are sensitive to during social interaction (Murray & Cooper, 1997). The findings of communication between depressed mothers and their infants revealed that not all depressive mothers disrupt the interaction in the same fashion, and that depressed mothers with comparable levels of depression do not have similar interactive styles.

Depressive mothers exhibit two characteristic communicative styles -the intrusive one and the withdrawn one -- which affect the infants differently. Intrusive mothers handle their infants in a rough way, they speak to them employing an angry tone of voice, poke at them and interfere with the infants' activities. Withdrawn mothers, on the other hand, are unresponsive, exhibit a flat affect and do not engage in the infants' activities. Infants of intrusive mothers are aversive, employing a substantial amount of looking away behaviour and do not look at objects whereas infants of withdrawn mothers are protesting (Tronick & Weinberg, 1997). In "abnormal" interactions where there is inappropriate infant-caretaker interaction, infants experience long periods of interactive failure and negative affect.

These findings show that infants respond actively and appropriately to the emotional and intersubjective tone of the mothers expression, withdrawing from aggressive intrusion, and protesting at isolation. They do not support the view of the infant as entirely dependent on maternal emotional "holding". Furthermore, the above findings indicate that infants are motivated to communicate with people, to form intersubjective states.

CHAPTER 4

PILOT STUDY

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1. AIMS OF THE PILOT STUDY

A pilot study, which began in November 1992 and was completed in June 1993, was designed to meet the following two objectives : First, to decide about the procedure of the main study and the conditions of the filming. Second, to develop a questionnaire for the parents in order to assess the subjective experience of each individual and each couple regarding infertility, IVF, the birth experience and the parental experience of the baby.

2. SUBJECT SELECTION

Four mother-infant dyads participated in the pilot study. Two mothers had boys while the other 2 had girls. Two mothers had conceived by IVF treatment, 1 mother had conceived by standard infertility treatment which did not include IVF, the fourth mother who had never experienced any infertility problems had conceived her child "naturally ". The families were contacted through their gynaecologists and were asked to participate in the study. Once their approval was given, they were contacted by the researcher who explained the details of the study. All mothers agreed to participate in the study.

3. PROCEDURE

All dyads were visited at home by the researcher. One dyad was visited at infant age 8, 12, and 19 weeks. The other was visited at infant age 15, 24, and 32 weeks, another dyad at infant age 12, and 16 weeks, and another one at infant age 6, 12, and 16 weeks. Different ages were selected in order to decide which age groups should be included in the main study.

The filming began in December 1992 and was completed in March 1993. All infants were videotaped while interacting with their mothers during normal everyday routine. The duration of each recording was 1 1/2 hours. The recordings included a feed, a nappy change, play with toys and play with no toys.

3.1 Development of the Interview Schedule

Once the recordings were completed, the parents were asked open-ended questions regarding the infertility experience, the IVF, the pregnancy, the birth and the initial adaptation to the infant. The women talked for a long time and their answers were tape recorded. Each tape was then transcribed and a verbatim account of the interview was kept. The questions pertaining to the infant's development and the relationship with the mother were repeated at each session.

When transcribed, the tapes revealed certain themes around which the final version of the interview was developed. Besides, it was recognised that the experiences with the infant slightly changed when the interview was given at infant age either at 24 or 32 weeks. On the basis of this finding it was decided to include an interview at infant age 32 weeks, in order to identify any changes, in the way the mother perceived her infant and her relationship with him/her.

A few characteristic extracts of the interviews communicated during the pilot study are given below.

About the IVF experience:

" During the IVF trials I felt as if I was in a Nazi concentration camp. It was an awful experience" .

" The whole procedure was psychologically demanding. The injections, the hormones and the frequent visits to the doctor's office were really difficult."

Feelings during the infertility period:

" I couldn't think about anything else than my infertility. This thought engaged my attention day and night."

" At first the thought preoccupied me continuously. After some time though, I got used to it and it wasn't so disturbing anymore."

Feelings about the infant

" To say that I was happy is an understatement. When you see your baby, after such struggling to have a baby, it is really fantastic. I don't know how to describe my feelings to you. I think that the word bliss, contentment, happiness gives you only an indication of the way I felt."

-(mother with no infertility experience) " I don't know how I felt. I think that the main feeling was a relief that the baby was healthy."

About the marital relationship:

(interview at infant age 6 weeks) " No change, I don't think that the baby affected our relationship. "

- (same mother infant age 32 weeks) " Relationships change once the baby is there. Not for the better. I don't know if it is only me that feels this way, if I am in a difficult period. But my life has changed radically and my husband is very occupied with his work and I think that the baby brings a distance to the couple because the wife can no longer give all her time to her husband as she used to do. "

On the basis of the answers given to the questions in the pilot interview, four groups of similar questions were included in the final version of the interview for all groups. For the INF and IVF groups a separate group of questions were included that pertained to the particular experiences of the participants in these two groups. The first group of questions included

demographic information such as age, years of marriage, education, occupation and sex of infant. The second group of questions addressed the relationship of the couple before the birth of the infant. The third group of questions assessed childbirth, breast feeding and the infant's daily routine while the fourth group of questions focused on the effect of the infant on the couple's relationship.

In the INF group certain questions were added which included the cause of infertility, the time attempting pregnancy, the subjective experience of infertility, its effect on the couple and the support given during that period. In the IVF group together with the special questions asked in the INF group, questions pertaining to the IVF experience, its effect on the individuals and the couple as well as the support given during that period were also included. The complete interviews given to the three groups are included in the Appendix I.

Some questions could be answered by a "yes" or a "no" while other's required the mothers to select one measure on a scale.

3.2 Observation of Videos

Once the filming was completed, the videos were repeatedly viewed. It became apparent that the feeding and the nappy changing sessions were not rich enough in communication and thus did not serve the objectives of the present study. It was, therefore, decided to exclude them from the main study and to maintain only the free play situations. Furthermore, regarding the ages of the infants, it was decided to include a neonatal period, so as to expand the period of observation avoiding the so called "difficult" periods of the infants, while selecting ages that would reveal developmentally important information.

CHAPTER 5

METHOD

1. RECRUITMENT OF SUBJECTS

As mentioned in the preface, the aim of this study was to examine mother-infant communication in families created as a result of the most common new reproductive method, i.e. IVF, with parental gametes, and to compare this mother-infant communication to that in two control groups. Therefore, the sample comprised three groups of first-born, full term healthy infants and their parents: 8 infants conceived by IVF were obtained with the assistance of gynaecologists working in IVF clinics; 8 infants conceived by standard infertility treatment (INF) were recruited through gynaecologists specialised in the field of infertility; and 8 infants conceived "naturally" (NIP initials standing for :No Infertility Problem) were recruited through the records of the maternity ward of the Alexandra Maternity Hospital in Athens (Greece) -- the biggest state maternity hospital in the Athens area. All of the parents were first contacted by their doctor who explained the purpose of the study. Those who agreed to participate were then contacted by telephone by the researcher who explained the details of the study and asked their agreement to participate.

Of mothers first approached, a total of 8 in the IVF group refused to participate, presenting various reasons : 3 mothers refused to participate because they did not want to be videotaped, 2 mothers because of family health problems, 1 mother because she had no time available, and 1 mother because her infant was admitted to hospital with consecutive vomiting. In the INF group there was 1 refusal, because the mother objected in being videotaped. In the NIP group, 1 mother declined to participate because she had no spare time as she was working and 1 mother because the family faced health problems. Thus, the refusals in the IVF group were considerably higher than those in the two control groups.

2. INCLUSION CRITERIA FOR THE IVF GROUP

Five criteria were employed in the selection of the subjects in the IVF group. First in the procedure of IVF the parental gametes had to be employed. As the focus of the present study was on the effect of IVF on parent-infant communication cases where donors were used were not included. Second, the parents had to have experienced at least one failed IVF cycle. This criterion was applied because the literature shows that failure of an IVF cycle is a traumatic experience. It was assumed that couples who had encountered no failure of an IVF cycle and were expecting a baby immediately after the first IVF attempt, may not have experienced the encounter with IVF as disturbing. Ideally the IVF sample should consist of couples who had experienced success after the same number of trials. This was not possible, however, due to the length of time required to find such a sample. The third criterion was that the infants had to be first born. This criterion was applied since the majority of IVF parents have only one child. The fourth criterion was that the infants had to be full term with no serious medical problem. Prematurity has been shown to affect parent-infant communication. In order to focus on the effects of infertility treatment itself, only full term infants were included, despite the fact that as prematurity is elevated in IVF treatment, a large number of IVF families had to be excluded. Finally, infants had to be single births, although multiple births are frequent in IVF treatment. As communication of twins and triplets with their parents is different from that of parents with only one child, it was decided to include only single births in the study.

3. DESCRIPTION OF SUBJECTS

The couples who conceived after IVF treatment were older than couples in the other two groups despite the effort made to match, as far as possible, the age of the participants. The education and vocation of parents was similar in all three groups (Table 5.1).

Table 5.1: Education and Vocation of Parents with Age range and Mean Age

		IVF		INF		NIP	
		Husband	Wife	Husband	Wife	Husband	Wife
	Age Range Age Mean	(31-51) 40.25	(34-39) 35.5	(31-38) 34.37	(28-43) 32	(30-43) 34.75	(26-41) 32.6
Education	High school	3	3	3	2	2	2
	Higher education	3	3	2	4	3	3
	University degree	2	2	3	2	3	3
Vocation	Labourer	0	0	0	0	1	0
	Employee	3	3	4	3	2	4
	Professional	4	4	4	5	5	4

The couples in the IVF group, who had experienced infertility for several years, had been married for much longer than the couples in both the INF and NIP groups (Table 5.2). The sex ratio of IVF infants has been reported to be similar to that of "natural" births, but in the present study there were 5 boys and 3 girls in the IVF group (Table 5.2). Although an effort was made to have an equal number of boys and girls, this objective was not achieved as at the time of data collection more of the parents who had conceived by IVF and who were willing to participate in the study, had boys.

Table 5.2: Years of Marriage and Sex of Infants

	IVF	INF	NIP
Years of Marriage			
Range	4-19	1-13	1-6
Mean	11.12	4.87	2.62
Sex of infant			
Boy	5	4	4
Girl	3	4	4

The mean duration of infertility in the IVF group was 6.81 years (Table 4. 3) which is in close agreement with findings reported in Chapter 1, that the mean duration of infertility in studies conducted in Britain was 6.3 years (Beral et al.,1990). Furthermore, in agreement with the same research review (Beral et al.,1990), the most common cause of infertility in the IVF group was tubal factors, while in the infertility group it was dysfunction in ovulation. It should be pointed out that the method of IVF was effective after an average of 4.25 attempts (Table 5. 3) .

Table 5.3: Duration and Aetiology of Infertility

	IVF	INF
Duration of infertility	1.5-17 years	1-12 years
Mean	6.81	3.4
Aetiology :		
Tubal factor	4	1
Endometriosis	3	2
Ovulation factor	0	3
Sperm factor	0	1
Unexplained	1	1
Number of IVF cycles		
2	1	
3	3	
4	1	
5	1	
6	1	
7	-	
8	1	
Mean = 4.25 cycles		

4. FILMING

All families were visited at home in order to observe communication between mothers and infants and fathers and infants in a familiar setting. Each family was visited five times, at infant age 4 weeks, 7 weeks, 13 weeks, 21 weeks and 35 weeks. These ages were chosen both to represent developmental stages and to avoid difficult or regressive periods (Plooij & Plooij, 1992). The visits were planned to occur immediately following a feed as during the pilot study this was reported by mothers to be the best time for the babies. The exact time was prearranged in a way that best suited the mother. In cases where the infant fell asleep immediately after the feed, which happened frequently when the infants were 4 weeks old, the family was revisited on the following day. In those instances when the infant was crying, or seemed tired, the recording was stopped; when the infant was calm again the recording was resumed. Whenever this was not possible the recording was cancelled and was re-arranged for the next day.

For each filming session, the parent was asked to choose the preferred room, usually the living room. Parents and infants sat opposite one-another, facing each other. Some parents held their infants on their lap or arms while others had them seated in a baby chair. Examples of the observational situation are included in the Appendix III. The researcher intervened only in cases where the filming was not possible because of the quality of lighting, e.g. the mother and infant sat in front of a window. Researcher and the camera were in the same room and could be seen by the infants. The researcher asked the parent to play with his/her child as he/she usually does and to ignore as far as possible the presence of the researcher. The filming continued for about 10 minutes, to allow parents to overcome any anxiety as a result of being filmed. All parents were recorded during face-to-face play, as research has shown that in the early weeks of life it is in this position that the infant's interactive capacities are most clearly seen (Brazelton, et al., 1974; Stern, 1977; Tronick et al., 1979). Subsequently, 3 minutes of this communication were chosen for analysis. This specific time period was decided upon because it is considered to be sufficient for the production of a typical sequence, of "engagement,"

intensification of attention and affect by the two partners, a development of reciprocal play and cyclical attention, followed by waning of attention (Tronick et al., 1978 & 1979). The first three minutes of filming were not analysed since most parents needed this time period to relax and forget as far as possible the presence of the researcher. The analysis of communication began immediately after the completion of this 3 min. time period provided that for the next 3 min. parents and infants were in a face-to-face position, and the infants were alert. In those few cases where these two conditions were not present, the researcher either started the analysis of communication a few seconds earlier or later.

All parent-infant dyads were filmed with a Video 8 Handycam manufactured by Sony. The master tapes were copied to new tapes on which digital time code displaying minutes, seconds and hundredths of seconds was inserted to aid micro-analysis.

5. PROCEDURE DURING HOME VISITS

5.1 First visit at infant age 4 weeks

5.1.1 Description of Psychological Tests

Recent research has shown that about 10-15% of women suffer from depression in the early months following childbirth, a large percentage of whom are not identified. In order to be sure that no depressed mother was included in the sample, all mothers were screened for depression using the Greek adaptation of the Edinburgh Postnatal Depression Scale. This scale was developed by Cox et al., 1987 and was adapted in Greek by Dragonas et al., 1996. It has proven sensitive for screening depression in the post-natal period (Murray & Carothers, 1990).

It has also been shown that a significantly higher incidence of stressful situations during the pregnancy period may lead to obstetric complications and adversely influence maternal interaction with the infant during the following months. It was therefore decided to administer a test in order to

assess whether any woman participating in the study had experienced increased stress as a result of recent events. The Recent Experiences by Holmes and Rahe (1967) adapted in Greek by Georgas et al., 1984, was given to all mothers participating in the study. This life event inventory was chosen because it has been suggested that it is appropriate for women in the postnatal period (Barnett et al., 1983).

5.1.2 Interview Schedule

The Life events Inventory and the Depression Scale were administered to all mothers before filming began, and while the infants were still asleep. The Parental Interview developed from the pilot study was also administered to all mothers during the first home visit. The interview was semi-structured in form and was tape-recorded. The researcher addressed the questions to the parents. After the completion of the first visit each tape recording was transcribed and the answers were transferred on the interview sheet (Appendix I).

When the infant woke up and was fed, the filming with the mother took place.

5.2 Second and Third visits at infant ages 7and 13 weeks

During the second and third home visits infants were video-taped communicating with their mothers as described above.

5.3 Fourth visit at infant age 21 weeks.

During the fourth visit infants were video-taped with both parents. The session with the father was made to gain information on the whole family system. In approximately half of the cases, the filming with the father preceded the one with the mother, while in the other half the filming with the father followed the one with the mother. This variation of the order of the recordings was arranged because it was expected that infants might become

weary in the second recording. The instructions given to the fathers were identical to those given to the mothers.

Once the recordings were completed, fathers were also given the same Parental Interview as was administered to mothers during the first visit. This was done in order to have the view of both parents regarding conception, pregnancy and the birth of the infant. Ideally the interview to both parents should have been administered during the first visit, but this proved impracticable because it was difficult to contact fathers more than once.

Finally, at this visit when the infants were aged 21 weeks, they were administered a standard developmental test in order to establish that all infants were developing normally. The Bayley Scales of Infant Development (BSID, Bayley, 1984) was employed. The researcher was trained and supervised in the administration of the test by a clinical psychologist.

5.4 Fifth visit at infant age 35 weeks.

During the last visit the mothers were not video-taped interacting with their infants because the infants had entered a completely new developmental phase, and by now most were mobile, thus the filming conditions of the previous visits could not be repeated. During this last visit mothers were given a Follow-Up Interview which presented a brief overview of the events since the first interview. Any changes in the family circumstances were noted.

CHAPTER 6 CODING SYSTEM FOR ANALYSIS OF THE VIDEO DATA

1. DEVELOPMENT OF THE METHOD FOR ANALYSING MOTHER-INFANT COMMUNICATION

At first, all the videos were viewed repeatedly, and, in each case, detailed descriptions were made of parent and infant behaviours during the face-to-face interaction. Subsequently, reduced coding schemes were developed from the preliminary detailed coding, to focus analysis on potentially communicative functions in these interactions.

Having studied the coding systems employed by Bakeman & Brown (1977), Stern et al. (1977) and Tronick et al. (1979, 1980), it was decided to first segment the interaction into simple behaviour units relating to different parts of the body, and different modalities of perception. This information would be useful for accurately describing details of the interaction, but possibly would not give an indication of the subjects' psychological processes or the functions of their communication. It has been pointed out that single behaviours may not reveal the motives or apparent interpersonal meaning of the interaction, as one behaviour can be substituted by another while the subject is attempting to achieve one and the same goal in the interaction with a partner (Brazelton et al., 1974; Bakeman & Brown, 1977). It was therefore decided, as a second step, to combine unit behaviours into more meaningful functional categories of behaviour. Finally, descriptions of communicative episodes were derived from these by observing the occurrence of natural combinations of behavioural functions in the interactions.

2. STAGES OF THE CODING DEVELOPMENT

2.1 First Stage: Coding in Behavioural Units

The behavioural coding scheme consisted of a list of movements of different body parts, of affective expressions, of caretaking behaviours and play, and of the state of arousal of the infant. Each category was given a full verbal definition (Appendix II) and the scheme was applied to two mother-infant dyads in order to determine whether the categories chosen were appropriate.

A one-second time interval was used, as recommended by Tronick (1980). Time interval coding has been criticised in the literature mainly because, in general, the time intervals employed are not short enough to discriminate important behavioural changes (Bakeman & Gottman,1992). A one-second interval was considered to be short enough for the present coding, as very rarely did more than one behaviour occur during one second. In the infrequent cases that this happened, the last behaviour occurring within that second was scored. Each behaviour was coded from the video recordings as it occurred throughout the second while the video was played both in slow motion and at normal speed. Once the coding was completed, the percentage frequency of each category was calculated for the observations of all 3 groups with the infants at 13 weeks of age (Appendix II).

After this pilot run, adjustments were made to take account of the frequencies of behaviours. Some codes were modified, and others were eliminated. This modified functional coding system was then applied to 3 minutes of free-play interaction for each mother-infant dyad in the three experimental groups when the infants were 13 weeks of age.

The categories of expressive behaviours for mother and infant, and their occurrence in percentage of time are presented in tables 6.1 and 6.2 below. These refer to three minutes of free-play for two mother-infant pairs combined; the infants were 13 weeks of age, and the time interval employed for the coding was one second.

Table 6.1: Percentages of Microanalytic Behaviour Categories for Mother

Face Expression		**Affect**		**Head Direction**	
Neutral	6.3	Present	75.6	Facing	96.5
Attentive	35.3	Absent	24.4	Part L or R	2.5
Surprised	0.2			Fully L or R	0.0
Coo Face	2.1			Other	0.0
Half Smile	42.3			N-I	1.2
Broad Smile	5.2				
Laughing	0.1				
Grimace	0.1	**Caretaking**		**Head Attitude**	
Frown	0.0	Present	1.7	Nose Level	98.4
Pout	0.0	Absent	98.3	Nose Up	0.2
Other	0.0			Nose Down	0.6
N-I	8.4			N-I	0.8
Play		**Gaze Direction**		**Body Position**	
No Play	74.2	Inf's Face	93.4	Close	27.0
Songs, Rhymes	0.2	Inf's body	2.6	Far	2.6
Hand Play	21	Away	2.7	Mid	70.4
Mouth Play	1.5	To self	0.1		
Boisterous Play	3.1	Other	0.0		
		N-I	1.2		

*N-I = Not Identified

Table 6.2: Percentages of Microanalytic Behaviour Categories for Infant

Arousal Level		**Face Expression**		**Head Direction**	
Aroused I	0.0	Neutral	17.4	Facing	65.7
Aroused II	97	Attentive	44.9	Partial L or R	31.9
Aroused III	2.1	Surprised	0.2	Total L	2.3
Aroused IV	0.9	Coo face	11.8	N-I	0.1
		Smile half	12.7		
Vocalisations		Smile broad	1.6	**Head Tilt**	
No speech	80.9	Laughing	0.4	Nose level	97.5
Prespeech	7.4	Grimace	2.8	Up	0.6
Coo, short	4.9	Frown	1.4	Down	1.8
Coo long	1.5	Pout	0.2	N-I	0.1
Laugh, Giggle	0.4	Cry	1.3		
Babble	0.0	Blink	0	**Gaze Direction**	
Grunt, etc.	3.8	Closed eyes	0.7	M's Face	54.8
Cry	0.9	Yawn, etc.,	0.5	M's Body	5.0
Other	0.2	Other	0.1	Away	37.8
		N-I	3.9	To Self	0.3
				Other	0.4
				N-I	1.7

*N-I = Not Identified

Note : A sample of a 45 second sequence coded for a mother and an infant is included in Appendix II.

2.2 Second Stage: Grouping of Behaviour Units in Functions

The categories which occurred in less than 3% of the observations were combined in conceptually uniform categories. This was not applied in those cases where, although the category was below 3% overall, it appeared frequently in one of the three groups observed, and thus was considered as possibly revealing something for that specific group. Those categories which occurred in more than 97% of the observations were eliminated as not revealing behavioural variations in the situation recorded.

The functional categories for the mother were derived as follows.

FACE EXPRESSIONS

The facial expression category 'Neutral' was renamed RELAXED. 'Attentive' was combined with the 'Surprised' as ATTENTIVE; 'Coo Face' was renamed CALLING; 'Half Smile', 'Broad Smile' and 'Laughing' were combined under one category named HAPPY. 'Grimace', 'Frown' and 'Pout' were combined as UNHAPPY. '

GAZE DIRECTION, HEAD DIRECTION, HEAD ATTITUDE and CARETAKING

These behaviours each had only one state in 97% of the time intervals, so were eliminated from the functional coding.

BODY POSITION

No modifications were produced in this modality and it was therefore maintained as in the initial coding scheme, with the functions CLOSE, FAR and MID.

AFFECT

No modifications were produced in this category and it was therefore maintained as in the initial coding scheme, but the presence or absence of Affect was named as EXPRESSIVE and INEXPRESSIVE, respectively .

PLAY

'Chants', 'Songs, 'Hand Play, Mouth Play and Boisterous Play were combined into one category which received the heading PLAYING. The 'No Play' category, when the mother was not playful, was named SERIOUS.

Functional categories for the infant were formed as follows.

AROUSAL LEVEL and HEAD TILT

These showed little variation. The infants were at "Arousal Level II' 96.9% of the time, and head tilt was 'Level' 97.6% of the time.

FACIAL EXPRESSION

A new category WATCHING included 'Attentive' and 'Surprised', the category COO FACE remained unchanged while 'Smile', Smile Half' and 'Laughing' were combined in one category named HAPPY. The categories 'Grimace', 'Frown', 'Pout' and 'Cry' were combined under one category named UNHAPPY. A 'Neutral' expression was renamed RELAXED.

HEAD ORIENTATION

The category FACING was kept unchanged. Other head orientations were combined in the function AWAY.

DIRECTION OF GAZE

Whenever the infant was looking to the mother's face or her body, this was designated as the function LOOK AT. The categories 'Away' and 'To self' were also combined as LOOK AWAY.

VOCALISATIONS

The category PRESPEECH was kept as a functional category unchanged. Short and long coos were combined under the heading COOING. The categories 'Grunt, etc.' and 'Cry' were combined under the heading DISTRESSED. 'Laugh' and 'Babble', with hiccups and sighs appeared extremely rarely, and were not scored as functions.

2.3 Third Stage: Development of Communicative Episodes

Two tables (Appendix II.3 & II. 4) were created, one for the parent and one for the infant, with the frequencies of all possible combinations of the categories. The combinations were united into conceptually relative groups, and thus the Communicative Episodes were constructed. The behaviour specifying whether the infant is held by the parent "close", "far", or at a "mid distance" did not reveal any information regarding parental episodes, and therefore, was not included in the combinations of behaviours that were transformed into episodes.

PARENTAL COMMUNICATIVE EPISODES AND THEIR DEFINITIONS

. Affectionate

The parent's facial expression is either neutral or positive, "smiling" or "calling" and he or she is physically demonstrating some kind of affection, i.e. caressing, kissing or hugging the infant.

. Play

The parent is smiling, has an exaggerated facial expression or is, calling, while he or she cheerfully chants, employs hand play (i.e. tickling, poking or bouncing) mouth play (i.e. biting), or boisterous physical play.

. Neutral

The parent's facial expression is "neutral", and the parent does not show affection or play behaviour, although the infant is held close.

. Negative

The parent's facial expression is unhappy and the parent is neither expressing affection, nor is in any way playing with the infant.

INFANT COMMUNICATIVE EPISODES AND THEIR DEFINITIONS

. Talking

The infant's facial expression is positive (i.e. "coo face", smiling) with gaze directed toward the parent, while either "facing" or "not facing" the parent; the infant is vocalising more than one sound, cooing or exhibiting prespeech movements.

. Playing

The infant's facial expression is positive (i.e. either "smiling" or "coo face"), the gaze is either directed toward or away from the parent, and the infant, is either facing or not facing the parent, may laugh, or vocalise single sounds. A key feature of this kind of episode is kicking feet and moving arms which indicate enjoyment.

. Attending

The infant's facial expression is either "neutral" or "attentive", the gaze is directed toward the parent, the infant is facing the parent, and there are no vocalisations or prespeech movements.

. Not Attending

The infant's facial expression is "neutral", the gaze is not directed to parent and the infant is either facing or not facing the parent. There are no vocalisations, prespeech movements, or cooing.

. Protesting

The infant's facial expression is either unhappy or neutral, the gaze is either directed or not directed toward the parent and the infant is either facing toward the parent or partially away from parent while vocalising negative sounds.

. Avoiding

The infant's facial expression is unhappy ("grimace", "cry", "frown") or "neutral", the gaze is not directed toward parent, and the infant is also turned away from parent. There is either no vocalisation, or vocalisation of negative sounds ("grunt", "cry", "fuss").

2.4 Fourth Stage : Coding Mother and Infant Episodes

Once the episodes were defined, they were applied to two videos at all age groups in order to determine whether these categories were appropriate for all ages. At this stage the following changes in the episodes of the mothers' behaviours appeared necessary: the CAREGIVING category which although present in the first coding system was later eliminated because it was infrequent in the 13 week age group, was re-introduced once again because it gave significant information on mothers' behaviour in the 4 week age group. The PLAY episode was modified to include a PLAY, INVOLVED and PLAY NOT INVOLVED episodes. Two new episodes were introduced to characterise parental talking behaviour, i.e. a TALK, INVOLVED episode and a TALK, NOT INVOLVED episode. Finally, an episode referring to parental INTRUSIVENESS, was included as some parents appeared to be intrusive in their caregiving behaviour.

In the infant episodes the following changes were introduced: The VEGETATIVE category which was included in the initial coding system had been eliminated as it was very infrequent in the 13 week age group . However, in the two younger age groups -- 4 week and 7 week -- behaviours such as hiccups, yawning, etc. were frequent and thus the category was re-introduced. Furthermore, in these early weeks infants often dozed off and therefore an episode referring to infant SLEEPING was included.

The Communicative Episode categories for the mother that were formed from the combinations of the behavioural functional categories, together with the changes introduced as above, were finally as follows:

CODING SYSTEM FOR PARENTAL EPISODES

. Caretaking

Any parental action or combination of actions that is concerned only with the infant's bodily needs, or is performed in order to calm distress.

. Affectionate

The parental facial expression is either neutral or positive i.e. smiling, "calling" and the parent is physically demonstrating some kind of affection i.e. caressing, kissing or hugging.

. Play, Involved

The parent's facial expression is smiling, exaggerated or calling, and he or she cheerfully chants, employs hand play such as (tickling, poking, bouncing, etc.) mouth play (biting) or boisterous physical play.

. Play, Not Involved

The parent plays or talks but appears not interested in the infant as a person . The focus of consciousness of the parent appears to be inward and self-concerned, with the result that play is not sensitive and joyful. i.e. Although the infant gives signs (by looking away, by becoming fussy) that he/she is not interested in the type of play the parent employs the parent disregards the infant's need or desire and continues the same play behaviour. This insensitive play is often followed by phrases which imply that the parent is not interested in what amuses the infant; i.e. "no , we are going to do what I want little fellow"

.Talk, Involved

The content of the parent's talk refers to the infant as a person i.e. the parent talks to the infant with an affectionate tone, giving time to the infant to respond and continually monitoring the infant's wishes. This type of talk is characterised by many questions i.e. "What is it you are telling me?" or "What is it you want" etc.

.Talk, Not Involved

The parent talks to the infant in a detached way or addresses the researcher; i.e. the parent talks about herself/himself and the speech does not involve in any way the infant. Phrases such as "I am very tired" or "I don't have any time for myself" are often heard in this type of talk. Besides, the parent addresses the researcher again mentioning feelings about self, or personal beliefs and attitudes and does not talk about the infant.

. Negative

An episode during which a parent's facial expression is unhappy, i.e. angry or impatient, mocking without good humour.

. Intrusive

The parent performs an intrusive caregiving activity which is considered as not fulfilling the infant's needs.

CODING SYSTEM FOR INFANT EPISODES

. "Talking"

The infant's facial expression is positive (i.e. "coo face", smiling) with gaze directed toward the parent, while either "facing" or "not facing" the parent; the infant is vocalising more than one sound, cooing or exhibiting prespeech movements.

. Playing

The infant's facial expression is positive (i.e. either "smiling" or "coo face"), the gaze is either directed toward or away from the parent, and the infant, is either facing or not facing the parent, may laugh, or vocalise single sounds. A key feature of this kind of episode is kicking feet and moving arms which indicate enjoyment.

. Attending

The infant's facial expression is either "neutral" or "attentive", the gaze is directed toward the parent, the infant is facing the parent, and there are no vocalisations or prespeech movements.

. Not Attending

The infant's facial expression is "neutral", the gaze is not directed to parent and the infant is either facing or not facing the parent. There are no vocalisations, prespeech movements, or cooing.

. Protesting

The infant's facial expression is either unhappy or neutral, the gaze is either directed or not directed toward the parent and the infant is either facing toward the parent or partially away from parent while vocalising negative sounds.

. Avoiding

The infant's facial expression is unhappy ("grimace", "cry", "frown") or "neutral", the gaze is not directed toward parent, and the infant is also turned away from parent. There is either no vocalisation, or vocalisation of negative sounds ("grunt", "cry", "fuss").

.Vegetative

Any behaviour that expresses regulation of the infant's body state ("yawning", "sneezing", "coughing").

. Sleeping

The infant falls asleep.

Appendix II shows a sample of a 180 second sequence coded for mother and infant episodes.

2. 5 Fifth Stage : The Coding of Episodes

Episodes defined as above were coded in all three groups (IVF, INF, NIP), and for all infant age groups (4, 7, 13 and 21 weeks with the mother, and 21 weeks with father). The episode categories were mutually exclusive, and the times of onset and offset of each episode was coded.

Once the coding of the episodes was completed it was decided to combine those episodes which were rare with functionally similar ones, in order to form fewer

categories both for the estimation of the inter-observer reliability and for the statistical analysis . The following changes were thus introduced in the parental Episodes: The episode of PLAY INVOLVED was renamed PLAY, while PLAY, NOT INVOLVED, which occurred rarely, was combined with the episode TALK, NOT INVOLVED which also appeared rarely, and were both designated as NOT INVOLVED. The episode INTRUSIVE was combined with the episode NEGATIVE under the heading NEGATIVE. Regarding the Infant Episodes the NOT ATTENDING episode was combined with the AVOIDING episode as the latter occurred rarely, and both were designated as NOT ATTENDING. The VEGETATIVE episode, which was rare, was combined with the SLEEPING category as both regulate body needs and have no intersubjective communicative function; the heading SLEEPING was retained. Thus, the following parental and infant episodes were included for the estimation of the inter-observer reliability and for the main statistical analysis.

PARENT	**INFANT**
Caretaking	Talking
Affective	Playing
Play	Attending
Talk	Not Attending
Not Involved	Protesting
Negative	Sleeping

3. Inter-Observer Reliability

A second rater was trained in the use of the above presented coding scheme of communicative episodes and an inter-observer reliability test was carried out. The episode categories were first demonstrated to the rater with their definitions. Then, jointly with the researcher, the rater applied the episodes to one family and any

problems regarding the definitions were clarified. Subsequently, the rater coded independently a sample of 10 out of the 120 observational sessions which were randomly selected, i.e. a total of 1737 seconds. Inter-rater agreement was estimated with Cohen's Kappa Coefficient. A kappa value was estimated for the parental episodes as a whole and subsequently for each maternal episode separately. The same procedure was followed for the infant episodes. First the mean value k was calculated for all the infant episodes, and then a separate kappa value was estimated for each episode separately.

The mean value of k for all parental episodes was .80. The mean value of k for all infant episodes was .75. In more detail, the value of kappa for each maternal episode was as follows: "caretaking" episode .74, "affective" episode .71, "play" episode .85, "talk " episode .82, "not involved" episode .53. Whereas, the mean value of each infant episode was as follows: "talk" episode .53, "play" episode .85, "attending" episode .80, "not attending" episode .73, "protesting" episode .76, "sleeping" episode .74. An example is given below on two relevant tables of the way Cohen's Kappa Coefficient was calculated for parental and infant episodes with the SPSS statistical package.

MZ by MY

MZ	Count / Exp Val / Tot Pct	MY 1	2	3	4	5	Row Total
1		101	14	8	14	0	137
		10.1	12.0	66.6	45.0	3.2	7.9%
		5.8%	.8%	.5%	.8%	.0%	
2		21	119	8	18	1	167
		12.3	14.6	81.2	54.9	3.9	9.6%
		1.2%	6.9%	.5%	1.0%	.1%	
3		3	12	787	38	17	857
		63.3	75.1	416.6	281.7	20.3	49.4%
		.2%	.7%	45.4%	2.2%	1.0%	
4		3	7	40	487	3	540
		39.9	47.3	262.5	177.5	12.8	31.1%
		.2%	.4%	2.3%	28.1%	.2%	
5		0	0	0	13	20	33
		2.4	2.9	16.0	10.8	.8	1.9%
		.0%	.0%	.0%	.7%	1.2%	
Column Total		128	152	843	570	41	1734
		7.4%	8.8%	48.6%	32.9%	2.4%	100.0%

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Kappa	.80257	.01212	50.40823	

MZ= Firsr rater coding mother

MY= Second rater coding mother

ASE1= Asymptotic standard error for K

Val/ASE0= the t statistic to test the null hypothesis that k=0

IZ by IY

IZ	Count / Exp Val / Tot Pct	IY 1	2	3	4	5	6	Row Total
1		82	0	0	21	68	0	171
		11.4	17.8	10.2	69.6	53.0	9.1	9.9%
		4.7%	.0%	.0%	1.2%	3.9%	.0%	
2		2	149	0	4	8	2	165
		11.0	17.1	9.8	67.2	51.1	8.8	9.5%
		.1%	8.6%	.0%	.2%	.5%	.1%	
3		1	5	93	8	19	16	142
		9.5	14.7	8.4	57.8	44.0	7.5	8.2%
		.1%	.3%	5.4%	.5%	1.1%	.9%	
4		27	18	4	639	44	5	737
		49.3	76.5	43.8	300.1	228.2	39.1	42.5%
		1.6%	1.0%	.2%	36.9%	2.5%	.3%	
5		4	6	4	30	396	4	444
		29.7	46.1	26.4	180.8	137.5	23.6	25.6%
		.2%	.3%	.2%	1.7%	22.8%	.2%	
6		0	2	2	4	2	65	75
		5.0	7.8	4.5	30.5	23.2	4.0	4.3%
		.0%	.1%	.1%	.2%	.1%	3.7%	
Column Total		116	180	103	706	537	92	1734
		6.7%	10.4%	5.9%	40.7%	31.0%	5.3%	100.0%

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Kappa	.75308	.01249	56.88378	

IZ= First rater coding infant

IY= Second rater coding infant

Note: The above inter-reliability results are considered as satisfactory, as a k > .75 is considered as an excellent agreement, a .40 < k <.75 is considered as fair to good agreement while a k<.40 is considered as poor agreement (Kraemer, 1982).

CHAPTER 7

DATA ANALYSIS, RESULTS AND INTERVIEW ANSWERS

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1. DATA ANALYSIS

This study is concerned with possible differences in communication between mothers and infants as a consequence of fertility treatment as these are reflected in the analysis of maternal and infant behaviour episodes in the three groups observed (IVF, INF, NIP), potential changes occurring in these episodes in the 4 ages that the infants were observed (4, 7, 13 and 21 weeks). Possible differences in communication between mothers and fathers of the three groups at infant age 21 weeks were also studied.

For each case there were 5 observational sessions: of mother-infant communication at 4, 7, 13 and 21 weeks and of father-infant communication at 21 weeks. At each session 12 variables were coded, measuring the frequency of each type of the 6 identified types of maternal episode (caretaking, affective, play, talk, not involved and negative), and each type of the 6 types of infant episode (talk, play, attend, not attend, protest and sleep). Thus, the data consists of 60 variables (12 variables x 5 observations) in 24 cases (8 subjects x 3 groups). Raw frequencies were translated into percentages of observational time after dividing by the observational time of the sessions and multiplying by 100.

The data from the coding sheets were processed by the Statistical Package for Social Sciences (SPSS, 6.0,1993) means, Standard deviations and ranges were calculated for each of the three groups and for each of the four ages, as well as for each type of maternal and infant episode.

In order to answer the question regarding group differences in maternal episodes, and simultaneously in order to test for possible changes of these episodes as a function of time, it was initially decided to employ non-parametric analysis, because the groups are of small size and, as can be seen by the large standard deviations, the data are not normally distributed. However, the non-parametric approach makes no provision for multivariate analysis of variance, and thus a large number of separate tests would have been required to make all the necessary comparisons, perhaps yielding significant results merely by chance. It was therefore decided to apply parametric analysis.

To answer the question regarding differences between the groups in maternal episodes and their changes over time, an analysis of variance (ANOVA for Repeated Measurements) was performed. The between-subjects factor was the treatment group (IVF, INF or NIP) and the within-subjects factor was infant age at four levels (4, 7, 13, 21 weeks). Whenever an age effect was observed, a polynomial test was conducted over the whole range of ages in order to estimate whether the age differences displayed a linear or curvilinear trend.

To answer the question regarding differences between the groups in infant episodes and their changes over time, an analysis of variance (ANOVA for Repeated Measurements) was performed. The between-subjects factor was the treatment group (IVF, INF or NIP) and the within-subjects factor was infant age at four levels (4, 7, 13, 21 weeks). Whenever an age effect was observed, a polynomial test was conducted over the whole range of ages in order to estimate whether the age differences displayed a linear or curvilinear trend.

Another ANOVA was computed to answer the question whether mothers and fathers differed in their communication with their infants at 21 weeks of age, The between-subjects factor was again the kind of group (IVF, INF, NIP) and the within-subjects factor was the gender of the parent (mother or father).

In addition to answer the question whether infants differed in their communication with their mothers and fathers at 21 weeks of age, ANOVA was conducted. The between-subjects factor was again the kind of group (IVF, INF, NIP) and the within-subjects factor was the gender of the parent (mother or father).

Finally, intercorrelations between the various types of episodes were examined by calculation of Pearson's Product-Moment Correlation Coefficients. At each age (4, 7, 13, 21 weeks) three intercorrelation matrices were produced: one between the types of maternal episodes, another between the types of infant episodes and another between the types of maternal episodes and infant episodes. For the 21 age group three more intercorrelation matrices were produced on data obtained with fathers: one for the types of paternal episodes, one for infant episodes with fathers and a third for the intercorrelations between the types of paternal and infant episode.

2. RESULTS FOR THE MATERNAL EPISODES

2.1 'Caretaking' Episodes :

The between group difference in the 'Caretaking' episode failed to reach significance ($F_{(2,21)} = 1.93$, $P = 0.169$) There was no significant age effect ($F_{(3,19)} = 0.36$, $P = 0.781$) but there was a significantly different pattern of change in the groups as a function of time ($F_{(6,40)} = 2.43$, $P = 0.043$). By age 21 weeks in the NIP group the caretaking episode was very infrequent, falling to 0.62% from 7.66% at infant age 13 weeks. In the IVF group it continued to be high in the 21 weeks (8.97%). The same relatively high level of 'Caretaking' (12.52%) was observed in the INF group at 21 weeks as Table 7.1 shows.

Table 7.1: Frequency of 'Caretaking' Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)		IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	5.55	14.37	9.44	9.79
	SD	4.00	11.47	12.49	10.30
	Range	0 - 10	0 - 32	0 - 37	0 - 37
7	Mean	15.70	6.61	4.86	9.06
	SD	14.41	6.56	6.52	10.62
	Range	2.8 - 46	0 - 19	0 - 19	0 - 46
13	Mean	8.52	7.23	7.66	7.80
	SD	6.00	7.15	6.85	6.41
	Range	0 - 19	0 - 19	0 - 19	0 - 19
21	Mean	8.97	12.52	0.62	7.37
	SD	10.50	13.27	1.55	10.67
	Range	0 - 27	0 - 35	0 - 4	0 - 35

2.2 'Affective' Episodes :

The between-group difference in 'Affective' episodes was not significant ($F_{(2,21)}=1.10$, $P = 0.352$). There was no significant difference in the pattern of change in the groups as a function of time. There was however, a significant time effect ($F_{(3,19)} = 4.25$ $P = 0.019$). The frequency of 'Affective' episodes decreased from 22% at infant age 4 weeks to 9% at 21 weeks (Table 7.2). The polynomial contrasts for the time effect gave a significant result for the linear component only (linear :$F_{(1,21)} = 10.85$, $P = 0.003$, quadratic:$F_{(1,21)} = 0.34$, $P = 0.565$, cubic: $F_{(1,21)} = 2.40$, $P = 0.136$); indicating that there is a significantly decreasing trend in 'affective' behaviour as the infant gets older in all 3 groups.

Table 7.2: Frequency of 'Affective" Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	16.63	26.18	23.78	22.20
	SD	14.40	25.31	21.03	20.25
	Range	0 - 43	7 - 75	0 - 64	0 - 75
7	Mean	10.78	7.32	23.18	13.76
	SD	8.74	7.76	21.18	15.05
	Range	3 - 30	0 - 22	0 - 65	0 - 65
13	Mean	10.26	15.09	18.78	14.71
	SD	17.94	12.41	21.04	17.09
	Range	0 - 54	0 - 39	0 - 55	0 - 55
21	Mean	5.98	7.72	13.54	9.08
	SD	4.90	5.07	15.04	9.74
	Range	0 - 14	1.7 - 17	0 - 37	0 - 37

2.3. 'Play' Episodes :

In play, between-group difference was not significant ($F_{(2,21)} = 0.21, P = 0.815$). No significant difference was observed in the groups as a function of time, $F_{(6,40)} = 0.58$, $P = 0.741$). There was however, a highly significant time effect ($F_{(3,19)} = 10.27$, $P < 0.001$). The frequency of play increased from 19% at infant age 4 weeks to 42% at 21 weeks (Table 7.3). The polynomial contrasts for the time effect gave a significant result for the linear component only (linear: $P < 0.001$, quadratic: $P = 0.308$, cubic: $P = 0.764$). This shows that there is a significant increase of playing as the infants grow older.

Table 7.3: Frequency of 'Play' Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	20.69	15.21	20.62	18.84
	SD	21.15	12.68	26.26	20.05
	Range	0 - 67	0 - 41	0 - 74	0 - 74
7	Mean	27.01	34.09	26.06	29.05
	SD	23.26	18.22	23.07	21.00
	Range	0 - 73	3 - 53	1 - 57	0 - 73
13	Mean	39.26	42.64	34.37	38.76
	SD	26.70	32.99	24.87	27.35
	Range	4 - 78	0 - 84	6 - 77	0 - 84
21	Mean	37.99	49.18	38.47	41.88
	SD	28.73	16.26	20.08	21.96
	Range	0 - 81	31 - 74	11 - 70	0 - 81

2.4 'Talk' Episodes :

The between-group difference in 'Talk' was not significant ($F_{(2,21)} = O.17$, $P = 0.849$). Further, no significant change was observed as the infants grew older ($F_{(3,19)} = 0.56$, $P = 0.645$) and there was no significant difference in the groups as a function of time ($F_{(6,40)} = 1.14$, $P = 0.354$). The average frequency of 'Talk' is 38.6% (Table 7.4).

Table 7.4: Frequency of 'Talk' Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	48.79	38.75	37.65	41.73
	SD	22.66	26.33	16.09	21.73
	Range	26 - 84	1.7 - 69	19 - 69	1.7 - 84
7	Mean	35.24	51.21	40.27	42.24
	SD	22.24	18.65	19.39	20.43
	Range	6.1 - 75	33 - 89	15 - 62	6 - 89
13	Mean	37.29	33.18	34.89	35.12
	SD	32.10	31.01	21.46	27.38
	Range	3.9 - 85	5 - 92	8.4 - 63	3.9 - 92
21	Mean	41.36	26.62	37.64	35.20
	SD	21.13	14.36	20.23	19.08
	Range	16 - 78	11 - 55	0 - 67	0 - 78

2.5 'Not Involved' Episodes :

The between-group difference in this behaviour was not significant ($F_{(2,21)} = 0.42$, $P = 0.665$). No significant change over time was noted ($F_{(2,21)} = 0.90$, $P = 0.459$) and no significant group by time interaction was observed ($F_{(2,21)} = 0.79$, $P = 0.581$). The average frequency of 'Not Involved' behaviour is 5.2% (Table 7.5).

Table 7.5: Frequency of 'Not Involved' Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	6.53	5.49	8.50	6.84
	SD	7.52	6.26	19.34	12.03
	Range	0 - 18	0 - 17	0 - 56	0 - 56
7	Mean	7.16	0.76	5.62	4.52
	SD	7.29	1.94	14.00	9.20
	Range	0 - 19	0 - 6	0 - 40	0 - 40
13	Mean	4.67	1.86	4.30	3.61
	SD	11.20	5.27	5.01	7.48
	Range	0 - 32	0 - 15	0 - 13	0-32
21	Mean	4.25	3.96	9.72	5.97
	SD	10.06	4.77	22.06	13.90
	Range	0-29	0-13	0-64	0-64

2.6 'Negative' Episodes:

This type of episode was only observed in the IVF group, it was too infrequent for statistical analysis (Table 7.6) and cannot sustain any explanation for this observation.

Table 7.6: Frequency of 'Negative' Episodes shown by Mothers in the 3 Groups with Infants at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	1.80	0.00	0.00	0.60
	SD	5.11	0	0	2.95
	Range	0 -14	0 - 0	0 - 0	0 - 14
7	Mean	4.10	0.00	0.00	1.36
	SD	11.59	0.00	0.00	6.70
	Range	0 - 33	0 - 0	0 - 0	0 - 33
13	Mean	0.00	0.00	0.00	0.00
	SD	0	0	0	0.00
	Range	0 - 0	0 - 0	0 - 0	0 - 0
21	Mean	1.46	0.00	0.00	0.49
	SD	4.12	0	0	2.38
	Range	0 - 17	0 - 0	0 - 0	0 - 17

2.7 Summary of the Analysis of Variance :

The ANOVA table for all the maternal episodes given below.depicts , as has already been mentioned, that there was no significant group effect in the maternal episodes, that a significant age effect was found in the 'Play' and 'Talk' episodes while there was a different pattern of change in the three groups as a function of time in the 'Caretaking' episode.

Table 7.7 : Analyses of Variance for Mother's Behaviour with one between-subjects factor (group) and one within subjects factor (infant's age)

Mother's Behaviour (Episode Type)	Group Effect p =	Age Effect p =	Group by Age Interaction p =
'Caretaking'	0.169	0.781	0 **.043***
'Affective'	0.352	0**.019***	0.411
'Play'	0.815	**< 0.001****	0.741
'Talk'	0.849	0.645	0.354
'Not involved	0.665	0.459	0.581

* Significance level .05

**Significance level .01 (2-tailed)

3. RESULTS FOR INFANT EPISODES

3.1 'Talk' Episodes:

The between-group difference was not significant in the 'Talk' Episode ($F_{(2,21)} = 0.02$, $P = 0.976$). No significant difference was observed in the groups as a function of time ($F_{(6,40)} = 0.87$, $P = 0.524$), however, there was a significant time effect ($F_{(3,19)} = 4.90$, $P = 0.011$). Indeed, the polynomial contrasts for the time effect give a significant result for both the linear and

quadratic components (linear :$F_{(3,19)} = 6.61$, $P = 0.018$, quadratic : $F_{(3,19)} = 5.50$, $P = 0.029$, cubic :$F_{(3.19)} = 3.07$, $P = 0.094$) indicating a curvilinear relationship between the talk episode and age. In all three groups the frequency of talking reaches a maximum at infant age 13 weeks. Furthermore, talk increases from 2% at 4 weeks of age to 16% at infant age 13 weeks and decreased to 4% at 21 weeks (Table 7.8).

Table 7.8: Frequency of 'Talk' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	2.63	4.44	0.00	2.36
	SD	6.20	6.90	0	5.45
	Range	0 - 18	0 - 16	0 - 0	0 - 18
7	Mean	0.42	5.76	10.76	5.65
	SD	1.18	9.19	22.62	14.16
	Range	0 - 3.3	0 - 27	0 - 66	0 - 66
13	Mean	18.94	13.82	14.88	15.88
	SD	23.31	29.61	21.18	23.95
	Range	0 - 71	0 - 86	0 - 55	0 - 86
21	Mean	4.10	4.37	4.30	4.26
	SD	7.67	8.88	9.13	8.20
	Range	0 - 23	0 -2 6	0 - 27	0 - 27

3.2 'Play' Episodes :

The between-group difference was significant in the 'Play' Episode ($F_{(2,21)} = 5.86$, $P = 0.010$). Both the IVF and the INF groups had significantly higher frequencies of play than the NIP group ($P = 0.018$ and $P = 0.004$ respectively). There was also a highly significant age effect ($F_{(3,19)} = 21.46$, $P < 0.001$). The polynomial contrasts for the age effect gave a significant result for the linear component only (linear: $F_{(3,19)} = 32.00$, $P < 0.001$, quadratic: $F_{(3,19)} = 0.18$, $P = 0.676$, cubic:$F_{(3,19)} = 1.48$, $P = 0.237$); showing that 'play' significantly increases in all three groups.: the frequency of play increases from 1% at 4 weeks of age to 16% at 21 weeks (Table 7.9). No significant difference was observed in the groups as a function of time ($F_{(6,40)} = 1.91$, $P = .0103$) but on the average the 'Play' episode in the NIP group is 3% while for the IVF and INF groups it is 9% and 11% respectively.

Table 7.9: Frequency of 'Play' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	0.00	0.07	0.28	0.11
	SD	0	0.20	0.78	0.46
	Range	0 - 0	0 - 0.5	0 - 2.2	0 - 2.2
7	Mean	1.11	3.96	1.39	2.15
	SD	2.15	9.25	3.13	5.67
	Range	0 - 5.5	0 - 27	0 - 8.9	0 - 27
13	Mean	17.06	14.03	5.16	12.08
	SD	19.14	13.47	9.62	14.88
	Range	0 - 54	0 - 34	0 - 28	0 - 54
21	Mean	18.26	24.60	6.18	16.35
	SD	20.94	18.58	7.61	17.81
	Range	0 - 52	2.4 - 62	0 - 18	0 - 62

3.3 'Attend' Episodes:

The between-group difference was not significant for the 'Attend' episode ($F_{(2,21)} = 0.09$, $P = 0.910$), no significant change was noted as the child grew older ($F_{(3,19)} = 0.85$, $P = 0.485$) and the pattern of change does not differ between the groups as the infants become older ($F_{(6,40)} = 2.27$, $P = 0.056$). The average frequency of the attending episode is 28% (Table 7.10).

Table 7.10 : Frequency of 'Attend' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	33.73	35.00	30.28	33.00
	SD	30.56	27.03	31.50	28.51
	Range	0 - 83	0.5 - 71	0 - 88	0 - 88
7	Mean	13.20	47.38	27.15	29.24
	SD	18.38	31.27	23.91	27.92
	Range	0 - 46	2.3 - 91	0 - 61	0 - 91
13	Mean	36.98	20.79	30.38	29.38
	SD	15.03	20.94	28.94	22.43
	Range	16 - 61	0 - 54	1.4 - 82	0 - 82
21	Mean	21.99	14.08	30.14	22.07
	SD	10.78	9.18	23.13	16.39
	Range	5.5 - 39	5.5 - 34	0.5 - 71	0.5 - 71

3.4 'Not Attend' Episodes:

The between-group difference in 'Not Attend' episodes was not significant ($F_{(2,21)} = 0.75$, $P = 0.486$), no significant change was observed over time ($F_{(3,19)} = 2.25$, $P = 0.115$) and the group-by-age interaction was not significant ($F_{(6,40)} = 0.83$, $P = 0.554$). The average frequency of 'Not Attend' is 40% (Table 7.11).

Table 7.11: Frequency of 'Not Attend' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	29.87	37.26	43.06	36.73
	SD	23 .71	25.80	29.76	25.95
	Range	3.9- 68	7.2 - 78	7.8 - 99	3.9 - 99
7	Mean	50.39	35.38	41.74	42.50
	SD	28.10	32.57	35.25	31.32
	Range	13.9 - 87	0 - 85	0 - 100	0 - 100
13	Mean	20.82	32.88	43.75	32.48
	SD	16.22	26.87	40.80	29.97
	Range	0 - 46	0 - 64	0 - 99	0 - 99
21	Mean	46.46	43.60	56.87	48.98
	SD	16.48	24.12	26.12	22.40
	Range	27 - 73	10 - 86	12 - 98	10 - 98

3.5 'Protest' Episodes:

The between-group difference of the 'Protest' Episodes was not significant ($F_{(2,21)} = 0.38$, $P = 0.686$), no significant change over time was observed ($F_{(3,19)} = 1.30$, $P = 0.302$) and the change with age was the same for all groups ($F_{(6,40)} = 1.29$, $P = 0.283$). The average frequency of 'Protest' is 9% (Table 7.12).

Table 7.12: Frequency of 'Protest' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	14.10	4.79	16.46	11.78
	SD	14.39	7.80	25.47	17.48
	Range	0 - 34	0 - 23	0 -7 8	0 - 78
7	Mean	22.37	3.67	17.22	14.42
	SD	16.02	4.38	30.32	20.71
	Range	0 - 41	0 - 12	0 - 89	0 - 89
13	Mean	3.96	9.48	0.07	4.50
	SD	11.19	20.90	0.20	13.66
	Range	0 - 32	0 - 60	0 - 0.6	0 - 60
21	Mean	6.33	11.51	1.39	6.41
	SD	11.12	16.07	3.93	11.78
	Range	0 - 30	0 - 36	0 - 11	0 - 36

3.6 'Sleep' Episodes:

The between-group difference for 'Sleep' was not significant ($F_{(2,21)} = 1.14$, $P = 0.339$). There was a highly significant age effect ($F_{(3,19)} = 6.14$, $P = 0.004$) while the change with age was similar in the three groups ($F_{(6,40)} = 0.89$, $P = 0.511$). The polynomial contrasts for the time effect gave a significant result for the linear component only (linear $F_{(3,19)} = 12.36$, :P = 0.002, quadratic $F_{(3,19)} = 1.55$, :P = 0.226, cubic: $F_{(3,19)} = 1.88$, $P = 0.185$). This shows that the 'Sleeping' episodes in all three groups decrease as the infants grow older (Table 7.13). The frequency of sleeping episode decreases from 16% at 4 weeks to 2% at 21 weeks of age (Table 7.13).

Table 7.13: Frequency of 'Sleep' Episodes shown by Infants in the 3 Groups at 4 ages

AGE (weeks)	GROUPS	IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
4	Mean	19.77	18.44	9.92	16.01
	SD	21.65	17.87	15.39	18.18
	Range	0 - 61	0 - 52	0 - 42	0 - 61
7	Mean	12.50	3.85	1.74	6.03
	SD	18.67	4.58	2.68	11.72
	Range	0 - 53	0 -1 3	0 - 6.7	0 - 53
13	Mean	2.25	9.00	5.76	5.67
	SD	2.62	13.98	12.29	10.75
	Range	0 - 6.1	0 - 37	0 - 34	0 - 37
21	Mean	2.85	1.82	1.11	1.93
	SD	6.97	3.42	1.33	4.41
	Range	0 - 20	0 - 9.6	0 - 3.3	0 - 20

3.7 Summary of the Analysis of Variance :

The ANOVA table for all the infant episodes given below.depicts , as has already been mentioned, that there was a significant group difference in the 'Play' Episode and that there was a significant age effect in the 'Talk', 'Play" and 'Sleep' Episodes.

Table 7.14: Analyses of Variance for Infant's Behaviour with one between-subjects factor (group) and one within-subjects factor (infant's age)

Infant's Behaviour (Episode Type)	Group Effect p =	Age effect p =	Group by Age interaction p =
'Talk'	0.976	**0.011***	0.524
'Play'	**0.010***	**< 0.001****	0 .103
'Attend'	0.910	0.485	0.056
'Not attend'	0.486	0.115	0 .554
'Protest'	0.686	0.302	0.283
'Sleep'	0.339	**0 .004****	0.511

* Significance level .05

**Significance level .01 (2-tailed)

4. DIFFERENCES BETWEEN EPISODES OF PARENTS' BEHAVIOURS

There were no significant differences between parental episodes. Fathers appeared to be less involved than mothers in 'Caretaking' (Tables 7.15 & 7.16) but the difference was not significant ($F_{(2,21)} = 2.58$, $P = 0.099$). Both fathers and mothers were less involved in 'Caretaking' in the NIP group. Both parents spend the same amount of time in the 'Affective' episode (Tables 7.15 & 7.16). Fathers do not spend more time than mothers in 'Play', ($F_{(2,21)}$

= 0.55, P = 0.588). Parents do not differ in 'Talk' and 'Not Involved' episodes ($F_{(2,21)} = 0.60$, P = 0.559; $F_{(2,21)} = 0.90$, P = 0.423; respectively).

Table 7.15: Frequency of Episodes shown by Fathers in the 3 Groups with Infants at age 21 weeks

EPISODES		IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
'Caretaking'	Mean	4.26	4.72	2.64	3.87
	SD	5.92	7.09	6.60	6.32
	Range	0 - 13	0 - 22	0 - 19	0 - 22
'Affectionate'	Mean	7.26	5.14	6.88	6.43
	SD	7.75	7.31	5.28	6.63
	Range	0 - 22	0 - 19	0 - 15	0 - 22
'Play'	Mean	61.33	45.00	45.48	50.60
	SD	17.07	21.22	14.19	18.63
	Range	33 - 94	17 - 78	18 - 65	17 - 94
'Talk'	Mean	25.36	35.21	40.27	33.61
	SD	14.59	19.46	21.47	18.98
	Range	4 - 44	4 - 54	0 - 68	0 - 68
'Not Involved'	Mean	1.29	9.93	4.73	5.32
	SD	2.14	12.78	5.20	8.51
	Range	0 - 6	0 - 38	0 - 16	0 - 38
'Negative'	Mean	0.49	0.00	0.00	0.16
	SD	1.37	0.00	0.00	0.79
	Range	0 - 4	0 - 0	0 - 0	0 - 4

Table 7.16: Frequency of Episodes shown by Mothers in the 3 Groups with Infants at age 21 weeks

EPISODES		IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
'Caretaking'	Mean	8.97	12.52	0.62	7.37
	SD	10.50	13.27	1.55	10.67
	Range	0 - 27	0 - 35	0 - 4	0 - 35
'Affectionate'	Mean	5.98	7.72	13.54	9.08
	SD	4.90	5.07	15.04	9.74
	Range	0 - 14	1.7 - 17	0 - 37	0 - 37
'Play'	Mean	37.99	49.18	38.47	41.88
	SD	28.73	16,26	20.08	21.96
	Range	0 - 81	31 - 74	11 - 70	0 - 81
'Talk'	Mean	41.36	26.62	37.64	35.20
	SD	21.13	14.36	20.23	19.08
	Range	16 - 78	11 - 55	0 - 67	0 -7 8
'Not Involved'	Mean	4.25	3.96	9.72	5.97
	SD	10.06	4.77	22.06	13.90
	Range	0 - 29	0 - 13	0 - 64	0 - 64
'Negative'	Mean	1.46	0.00	0.00	0.49
	SD	4.12	0.00	0.00	2.38
	Range	0 -1 7	0 - 0	0 - 0	0 -1 7

Table 7.17: Analyses of Variance for Mother's Behaviour with one between-subjects factor (group) and one within-subjects factor (parent)

Mother's Behaviour (Episode Type)	Group effect P	Parent effect P	Group by Parent interaction P
'Caretaking'	0.099	0.130	0.206
'Affective'	0.378	0.278	0.411
'Play'	0.588	0.127	0.146
'Not involved'	0.423	0.858	0.436
'Talk'	0.559	0.731	0.096
'Negative'	0.198	0.550	0.696

5. DIFFERENCES IN EPISODES OF INFANTS COMMUNICATING WITH PARENTS IN THE THREE GROUPS

No significant differences were observed between the groups in the episodes of infants behaviour when they were communicating with fathers. Furthermore, there was, no time effect or different change in the groups as the infants grow older (Tables, 7.18; 7.19).

Table 7.18: Frequency of Episodes shown by Infants in the 3 Groups with Fathers at age 21 weeks

EPISODES		IVF (n=8)	INF (n=8)	NIP (n=8)	All GROUPS (n=24)
'Talk'	Mean	9.03	1.67	5.76	5.49
	SD	16.47	2.86	12.64	11.96
	Range	0 - 47	0 - 8.3	0 - 36	0 - 47
'Play'	Mean	21.94	14.44	12.71	16.36
	SD	21.96	14.58	14.94	17.21
	Range	0 - 54	0 - 34	0 - 48	0 - 54
'Attend'	Mean	20.62	21.80	29.72	24.05
	SD	13.74	10.26	25.85	17.60
	Range	4 - 46	9 - 38	6 - 84	4 - 84
'Not Attend'	Mean	43.95	54.37	46.25	48.19
	SD	27.55	14.91	25.85	22.87
	Range	23 - 94	36 - 83	7 - 76	7 - 94
Protest	Mean	1.80	7.43	2.22	3.82
	SD	4.10	15.78	3.89	9.61
	Range	0 - 12	0 - 44	0 - 11	0 - 44
'Sleep'	Mean	2.65	0.28	3.33	2.09
	SD	2.42	0.78	5.59	3.64
	Range	0 - 6	0 - 2	0 - 14	0 - 14

Table 7.19: Analyses of Variance for infant's behaviour with one between-subjects factor (group) and one within-subjects factor (parent)

Episode Type	Significance of group effect p =	Significance of Parent effect p =	Group by Parent interaction p =
'Talk'	0.650	0.683	F0.582
'Play'	0.214	0.998	0.287
'Attend'	0.185	0.657	0.656
'Not attend'	0.772	0.898	0.362
'Protest'	0.297	0.134	0.362
'Sleep'	0.548	0.884	0.363

6. CORRELATIONS BETWEEN EPISODES AT INFANT AGE 4 WEEKS

6. 1 Correlations Between Maternal Episodes

A significant negative correlation was found between the mothers' 'Caretaking' and 'Talk' episodes (-0.428) -- the more mothers were concerned with caretaking the less they were involved in talking. A significant negative correlation was also observed between the 'Affective' and 'Talk' episodes (-0.608, Table 7.20), indicating that the more mothers are expressing affect the less they are involved in talking.

6.2 Correlations Between Infant Episodes

A significant negative correlation was observed between the infant 'Attend' and 'Not Attend' episodes (-0.639). The more infants were attending the less they were not attending. A significant negative correlation was also observed between 'Attending' and 'Protesting' (-0.434, Table 7.21) showing that the more attentive the infants were the less they were protesting.

6.3 Correlations Between Behaviour Episodes Mother and Infant

A highly significant correlation was observed between infant 'Attending' and mother 'Playing' (0.580) -- the more infants attended the more mothers played and vice versa. A highly significant positive correlation was also found between infant 'Protesting' and mother 'Not Involved' (0.773). Finally a highly significant positive correlation was also observed between infant 'Sleeping' and mother 'Affective' episodes (0.560; Table 7.22) indicating that the more infants are sleeping the more mothers are involved in an affective or comforting behaviour.

Table 7.20: Correlations between Mother Episodes at 4 weeks

Mother	Caretaking	Affective	Play	Talk	Not Involved	Negative
Caretaking						
Affective	0.327					
Play	-0.366	-0.348				
Talk	**-0.428***	**-0.608****	-0.243			
Not Involved	-0.017	-0.336	-0.278	0.024		
Negative	-0.030	0.216	-0.200	-0.142	0.007	

Table 7.21: Correlations between Infant Episodes at 4 weeks

Infant	Talk	Play	Attend	Not Attend	Protest	Sleep
Talk						
Play	-0.113					
Attend	0.062	103				
Not Attend	0.105	-0.063	**-0.639****			
Protest	-0.237	-0.050	**-0.434***	-0.129		
Sleep	-0.317	-0.016	-0.260	-0.331	-0.025	

Table 7. 22: Correlations between Mother & Infant Episodes at 4 weeks

infant/ Mother	Talk	Play	Attend	Not Attend	Protest	Sleep
Caretaking	0.014	0.208	-0.115	-0.043	-0.049	0.185
Affective	-0.111	0.151	-0.363	0.216	-0.280	**0.560****
Play	0.009	-0.093	**0.580****	-0.318	-0.221	-0.242
Talk	0.151	-0.111	0.044	0.208	-0.013	-0.395
Not Involved	-0.090	-0.062	-0.275	-0.162	**0.773****	-0.052
Negative	-.092	-0.053	-0.247	-0.046	0.202	0.288

* - Significance Level .05 ** - Significance Level .01 (2-tailed)

7. CORRELATIONS BETWEEN BEHAVIOUR EPISODES AT INFANT AGE 7 WEEKS

7.1 Correlations Between Maternal Episodes

Mothers' 'Play' and mothers' 'Talk' episodes show a negative correlation (-0.562, Table 7.23); mothers are playing the less they are talking.

7.2 Correlations Between Infant Episodes

A negative correlation was observed between the infant 'Attend' and the infant 'Not Attend' episodes (-0.700, Table 7.24).

7.3 Correlations Between Mother and Infant Episodes

A significant positive correlation was observed between the infant 'Not Attend' episode and the mother 'Affective' episode (0.423) mothers are more involved in an affective episode when infants are not attending and vice versa. A significant positive correlation was also observed between the infant 'Protest' episode and the mother 'Not Involved' episode (0.829) and, finally a significant positive correlation was also found between the infant's 'Sleeping' and the mother's 'Caretaking' (0.747, Table 7.25) -- the more infants are sleeping the more mothers are involved in caretaking.

Table 7.23: Correlations between Mother Episodes at 7 weeks

Mother	Caretaking	Affective	Play	Talk	Not Involved	Negative
'Caretaking'						
'Affective'	-0.214					
'Play'	0.009	-0.273				
'Talk'	-0.347	-0.320	**-0.562****			
'Not Involved'	-0.142	-0.222	-0.384	0.177		
'Negative'	0.119	0.230	-0.295	-0.261	0.011	

Table 7.24: Correlations between Infant Episodes at 7 weeks

Infant	Talk	Play	Attend	Not Attend	Protest	Sleep
'Talk'						
'Play'	-0.023					
'Attend'	0.192	0.078				
'Not Attend'	-0.401	-0.123	**-0.700****			
'Protest'	-0.264	-0.179	-0.308	-0.217		
'Sleep'	-0.118	0.003	-0.237	-0.079	-0.047	

Table 7.25: Correlations between Mother & Infant Episodes at 7 weeks

Infant / Mother	Talk	Play	Attend	Not Attend	Protest	Sleep
'Caretaking'	-0.269	0.111	-0.110	-0.081	0.001	**0.747****
'Affective'	-0.133	-0.220	-0.232	**0.423***	-0.137	-0.068
'Play'	0.177	0.243	0.285	-0.103	-0.374	-0.072
'Talk'	0.169	-0.047	0.175	-0.109	0.033	-0.363
'Not Involved'	-0.190	-0.160	-0.369	-0.088	**0 .829****	-0.044
'Negative'	-0.085	-0.081	-0.223	-0.043	0.240	0.365

* - Significance Level .05 ** - Significance Level .01 (2-tailed)

8. CORRELATIONS BETWEEN EPISODES AT INFANT AGE 13 WEEKS

8.1 Correlations Between Maternal Episodes

As with infants 7 weeks old, a significant negative correlation was found between the mothers' 'Play' and the mothers' 'Talk' (-0.711, Table 7.26); the more mothers are involved in playing the less they are involved in talking.

8.2 Correlations Between Infant Episodes

Again a significant negative correlation was observed between infant 'Attend' and infant 'Not Attend' episodes (-0.595, Table 7.27).

8.3 Correlations Between Mother and Infant Episodes

Infant 'Talk 'at 13 weeks was negatively correlated with mothers' ' Play' (-0.418, Table 7.28) --when infants are talking more mothers play less. In contrast, positive correlations were observed between the infant 'Talk' and mother 'Talk' episodes (0.415, Table 7.28) and between infant 'Play' and mother 'Play' episodes (0.561, Table 7.28) the more infants talk or play the more mothers talk or play. Furthermore, a positive correlation was found between infant 'Attend' and mothers' 'Play' episodes (0.413, Table 7.28) showing that the more infants are attending the more mothers are likely to be playing. A negative correlation between infant 'Play' and mother 'Talk' episodes (-0.419, Table 7.28) shows that the more infants play the less mothers talk. A negative correlation between infant 'Attend' and mother 'Affective' episodes (-0.409, Table 7.28) shows that the more infants are attending the less mothers are exhibiting affective expressions.

Table 7.26: Correlations between Mother Episodes at 13 weeks

Mother's	Caretaking	Affective	Play	Talk	Not Involved	Negative
'Caretaking'						
'Affective'	0.053					
'Play'	-0.125	-0.318				
'Talk'	-0.222	-0.323	**-0.711****			
'Not Involved'	0,292	0.015	-0.221	-0.130		
'Negative'	-	-	-	-	-	

Table 7.27: Correlations between Infant Episodes at 13 weeks

Infant's	Talk	Play	Attend	Not Attend	Protest	Sleep
'Talk'						
'Play'	-0.349					
'Attend'	-0.042	0.192				
'Not Attend'	**-0.413***	-0.384	**-0.595****			
'Protest'	-0.207	0.044	-0.283	-0.092		
'Sleep'	-0.242	0.007	-0.240	0.023	-0.024	

Table 7.28: Correlations between Mother & Infant Episodes at 13 weeks

Infant. / Mother	Talk	Play	Attend	Not Attend	Protest	Sleep
'Caretaking'	-0.150	-0.003	-0.097	0.002	0.243	0.226
'Affective'	0.081	-0.069	**-0.409***	0.286	-0.121	0.124
'Play'	**-0.418****	**0.561****	**0.413***	-0.301	0.076	0.035
'Talk'	**0.415***	**-0.419***	-0.081	0.024	.-0.035	-0.198
'Not Involved'	-0.048	-0.355	-0.194	0.356	-0.081	0.116
'Negative'	-	-	-	-	-	-

* - Significance Level .05 ** - Significance Level .01 (2-tailed)

9. CORRELATIONS BETWEEN EPISODES AT INFANT AGE 21 WEEKS

9.1 Correlations Between Maternal Episodes

Mothers' ' Playing' was negatively correlated with mothers' ' Talking' (-0.637, Table 7.29); the more mothers play the less they talk.

9.2 Correlations Between Infant Episodes

A negative correlation is found between 'Play' and 'Not Attend' episodes (-0.493, Table 7.30), showing that the more infants play the less they are not attending.

9.3 Correlations Between Mother and Infant Episodes

A negative correlation is observed between the infant 'Talk' episode and the mother 'Negative' episode (-0.481, Table 7.31) the more infants talk the less mothers express negative affect. A positive correlation is found between the infant 'Play' and mothers' ' Play' (0.616, Table 7.31); and a negative correlation between the infant 'Play' episode and the mother 'Talk' episode (0-.456, Table 7.31) shows that the more infants play the less mothers talk. A negative correlation between the infant 'Attend' episode and the mother 'Not Involved' episode (0-.496, Table 7.31) showing that when infants attend mothers are less likely to be 'Not involved'. The infant 'Not Attend' episode is positively correlated with the mother 'Talk' episode (0.555, Table 7.31) -- infants attend more when mothers are talking. When infant 'Protest' the mother is more likely to show ' Caretaking' (0.482, Table 7.31), Finally positive correlations are also observed between the infant 'Sleeping' episode and maternal 'Caretaking' (0.562, Table 7.31), and mothers' ' Negative' episodes (0.873, Table 7.31). When infants are sleeping mothers are likely to be showing 'Caretaking' behaviour or negative expressions.

Table 7.29: Correlations between Mother's Episodes at 21 weeks

Mother's	Caretaking	Affective	Play	Talk	Not Involved	Negative
'Caretaking						
'Affective'	0.045					
'Play'	-0.250	-0.398				
'Talk'	-0.193	0.077	**-0.637****			
'Not Involved'	-0.205	-0.221	-0.215	-0.241		
'Negative'	0.396	0.056	-0.110	-0.182	-0.092	

Table 7.30: Correlations between Infant's Episodes at 21 weeks

Infant's	Talk	Play	Attend	Not Attend	Protest	Sleep
'Talk'						
'Play'	-.0150					
'Attend'	-0.055	-0.260				
'Not Attend'	-0.220	**-0.493***	-0.391			
'Protest'	-0.121	-0.021	-0.195	-0.368		
'Sleep'	0.392	-0.229	-0.059	-0.239	0.234	

Table 7.31: Correlations between Mother's and Infant's Episodes

Infant. ./ Mother	Talk	Play	Attend	Not Attend	Protest	Sleep
'Caretaking'	0.077	-0.090	-0.213	-0.165	**0.482***	**0.562***
'Affective'	0.299	-0.327	-0.297	0.260	0.161	0.121
'Play'	-0.081	**0 .616****	-0.037	-0.290	-0.205	-0.178
'Talk'	-0.161	**-0.456***	-0.047	**0.555****	-0.119	-0.188
'Not Involved'	-0.002	-0.029	**-0.496***.	-0.328	0 .024	-0.125
'Negative'	-0.481*	-0.122	-0.012	-0.180	-0.116	**0.873****

* Significance Level .05 ** Significance Level .01 (2-tailed)

10. CORRELATIONS BETWEEN EPISODES AT INFANT AGE 21 WEEKS WITH THE FATHER

10.1 Intercorrelations between Paternal Episodes

A negative correlation is observed between fathers' ' Caretaking' and 'Talk' (-0.513, Table 7.32), showing that the more fathers are concerned with caretaking the less they are involved in talk. A positive correlation found between 'Caretaking' and 'Not Involved' episode (0.417, Table 7.32), indicates that the more fathers are involved in 'Caretaking' the more they are also not involved with the infant in communicating. A negative correlation is also found between the 'Play' and 'Talk ' (-0.629, Table 7.32); -- the more fathers are involved in playing the less they are talking. A negative correlation observed between the 'Play' episode and the 'Not involved' episode (-0.442, Table 7.32) shows that the more fathers are playing the less they are not involved, -- they are communicating while playing.

10.2 Correlations Between Infant Episodes

A negative correlation between the infant 'Talk' and infant 'Not Attend' (-0.482, Table 7.33) shows that the more infants are expressing 'Talk' the less they are 'Not attending'. Again, a negative correlation is found between the 'Attend' episode and 'Not Attend' episodes (-0.502, Table 7.33).

10.3 Correlations Between Father and Infant Episodes

A positive correlation is observed between the infant 'Not Attend' episode and the father 'Negative' episode (0.431, Table 7.34), showing that when infants are not attending, fathers are more likely to express negative behaviour. A positive correlation between the infant 'Protest' and the fathers' ' Caretaking ' (0.481, Table 7.34), implies that the more infants are protesting the more fathers are involved in caretaking. A negative correlation is found between infant 'Protest' episode and father's 'Play' (-0.471, Table 7.34); fathers play less when infants are protesting. A positive correlation is found between the infant 'Protest' and the fathers' 'Not

Involved' episodes (0.816, Table 7.34), indicating that the more infants are protesting the more fathers are not involved.

Table 7.32: Correlations between Father Episodes at 21 weeks

Father's Episodes	Caretaking	Affective	Play	Talk	Not Involved	Negative
'Caretaking'						
'Affective'	0.305					
'Play'	-0.110	-0.356				
'Talk'	**-0.513***	-0.251	**-0.629****			
'Not Involved'	**0.417***	0.309	**-0.442***	-0.259		
'Negative'	-0.130	0.150	0.177	-0.165	-0.133	

Table 7.33: Correlations between Infant Episodes at 21 weeks

Infant's Episodes	Talk	Play	Attend	Not Attend	Protest	Sleep
'Talk'						
'Play'	-0.132					
'Attend'	.0152	-0.331				
'Not Attend'	**-0.482***	-0.403	**-0.502***			
'Protest'	-0.144	-0.159	-0.137	-0.098		
'Sleep'	0.014	0.260	0.258	-0.107	-0.134	

Table 7.34: Correlations between Father and Infant categories at 21 weeks

Infant. Cat./ Father Cat.	Talk	Play	Attend	Not Attend	Protest	Sleep
'Caretaking'	-0.222	-0.260	0.050	0.089	**0.481***	-0.112
'Affective'	0.121	-0.118	-0.092	0.003	0.270	0.090
'Play'	0.197	0.142	-0.002	-0.014	**-0.471***	0.024
'Talk'	-0.063	0.135	0.053	-0.066	-.0154	0.130
'Not Involved'	-0.211	0.309	-0.058	0.073	**0.816****	-0.177
'Negative'	-0.098	-0.202	-0.223 .	**0.431***	-0.085	-0.122

* Significance Level .05 ** Significance Level .01 (2-tailed)

11. ANSWERS GIVEN TO THE INTERVIEW SCHEDULE

As there are only 8 subjects in each group, no statistical analysis was conducted on the answers given to the interviews which are presented in Tables 7.35 to 7.53.

Table 7.35: Marital Relationship Before the Birth of the Infant

	NIP		INF		IVF	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
excellent	3	0	2	0	4	2
very good	1	4	1	4	1	4
good	4	4	5	4	2	2
average	0	0	0	0	0	0
unsatisfactory	0	0	0	0	0	0

No differentiation between the three groups is indicated. Most couples in all three groups describe their relationship as 'good' to 'excellent', and in all three groups women are more positive in their descriptions than men. This difference could simply indicate a variation in the mode of expression between men and women, as when answering this question, men, often stated " as there isn't anything in this world which can be described as being excellent or perfect I would say that our relationship is very good". Or, women may 'feel' different about relationships.

Table 7.36: Frequency of Sexual Relationship Before Pregnancy

	NIP		INF		IVF	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
weekly	0	0	0	0	0	0
1-2	6	6	5	6	5	5
3-4	2	2	1	2	3	3
daily	0	0	2	0	0	0

As can be seen, no clear differentiation appears between the three groups. Most couples report that the frequency of their sexual relationship was 1 - 2 a week. It is interesting, though, that men and women do not always have an identical view on the frequency of their sexual relationship.

Table 7.37: Frequency of Quarrelling Before the Birth of the Infant

	NIP		INF		IVF	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
never	0	0	2	2	4	2
rarely	3	3	4	3	4	5
moderate	4	4	2	3	0	1
often	1	1	0	0	0	1
constantly	0	0	0	0	0	0

As can be noted, most couples in the NIP group describe the frequency of their quarrelling as being 'moderate' to 'rare'. However, compared to the NIP group, most couples in the INF and IVF groups report that they quarrelled less often. This finding could indicate that the quality of the relationship in these two groups is superior to the quality of the relationship in the NIP group.

Table 7.38: Marital Relationship Following the Birth of the Infant

	NIP		INF		IVF	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
improved	2	4	7	5	7	6
deteriorated	5	2	0	0	0	0
improved & deteriorated	1	1	0	0	1	1
unaltered	0	1	1	3	0	1

Most women in the NIP group report that their marital relationship deteriorated after the birth of their infant, while half of the men state that their relationship improved. In the INF and IVF groups most men and women report that their relationship improved.

Table 7.39: Sexual Relationship Following the Birth of the Infant

	NIP		INF		IVF	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
as before	8	6	7	7	4	3
not as before	0	2	1	1	4	5

The sexual relationship for most couples in the NIP and INF groups, following the birth of their infant, remained unchanged. However, in the IVF group about half of the couples report a change.

Table 7.40: Infertility Experience

	INF		IVF	
	WOMEN	MEN	WOMEN	MEN
very distressed	7	5	6	5
not very distr.	1	3	2	3
ambivalent	0	0	0	0

No differentiation is noted between the two groups. However, the infertility experience is described as more stressful by women than by men in both groups.

Table 7.41: Effect of Infertility on Marital Relationship

	INF		IVF	
	WOMEN	MEN	WOMEN	MEN
closer	5	3	4	6
apart	1	2	0	0
no change	2	3	4	2

Most women in the INF group and men in the IVF group report that the infertility experience brought them closer.

Table 7.42: Effect of Infertility on Sexual Relationship

	INF		IVF	
	WOMEN	MEN	WOMEN	MEN
ameliorated	0	0	0	0
worsened	4	5	4	4
no effect	4	3	4	4

Regarding the sexual relationship, no differentiation between the two groups is noted. However, half of the women in both the INF and IVF groups,

together with men in the IVF group, seem to think that infertility did affect their sexual relationship, while the other half do not report that their sexual experience was negatively affected. More men in the INF group report that their sexual relationship deteriorated as a result of the infertility experience.

Table 7.43: Assessment of IVF Experience

	NUMBER OF COUPLES
psychologically demanding	3
physically demanding	2
psychologically & physically demanding	1
not very demanding	2

Regarding the IVF experience more couples think that it is a demanding treatment.

Table 7.44: The Most Stressful Phase of IVF

	NUMBER OF COUPLES
ovulation induction	0
oocyte retrieval	2
embryo transfer	0
waiting for the results	6

The most stressful phase of IVF reported is after the embryo transfer and until the day of the pregnancy test. The next most stressful phase is the oocyte retrieval.

Table 7.45: Support During the IVF Experience

	NUMBER OF COUPLES
husband	7
mother	0
relatives	0
friends	0
nobody	1

The vast majority of mothers report that, during the IVF experience, support was given almost exclusively by their husband.

Table 7.46: IVF Disclosure/Secrecy

	NUMBER OF COUPLES
Disclosure	6
Secrecy	2

Regarding disclosure of IVF, 6 out of the 8 couples had discussed with family and friends the method by which they had conceived.

Table 7.47: Emotional Experience of Pregnancy

	NIP		INF		IVF	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
happy	2	4	3	0	0	2
anxious	2	1	2	3	4	4
happy/anxious	1	0	2	5	0	0
awkward	2	2	0	0	0	0
tired	0	0	1	0	0	0
afraid	1	1	0	0	4	2

Most couples in the NIP group report feeling 'happy' during pregnancy. Most couples in the INF describe that they felt 'anxious/happy', while most couples in the IVF group report feeling mainly 'anxious' during pregnancy.

Table 7.48: Sexual Intercourse during Pregnancy

	NIP	INF	IVF
affirmative	4	2	0
only initially	3	2	0
very rarely	0	1	0
negative	1	3	8

It is noted that no IVF couple had sexual intercourse during the nine month period of pregnancy.

Table 7.49: Method of Delivery

	NIP	INF	IVF
normal vaginal	6	3	2
caesarean section	2	5	6

The caesarean section method of delivery is more common in the IVF group, but it is also high in the INF group. This implies that both IVF and INF are considered as "high risk" pregnancies by the medical services.

Table 7.50: Description of the Birth Experience

	NIP		INF		IVF	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
'fantastic'	4	4	1	3	4	5
'important experience'	0	4	1	3	0	3
'as expected'	0	0	0	0	0	0
'difficult'	0	2	0	0	0	0
'stressful/fearful'	3	0	1	1	2	0
'tiring'	0	0	0	1	0	0
'anxious'	1	0	5	0	2	0
incomplete	0	0	0	1	0	0

Most couples in the NIP and IVF groups report that childbirth constituted a 'fantastic' experience, the 'most important' experience in their life. Men in all groups report more 'anxiety' feelings. This was even more emphasised by those men who were not present in the delivery room and who waited in the maternity ward. The woman who reports that the experience felt as "incomplete" referred to the fact that she was given anaesthesia and thus did not "really" experience giving birth.

Table 7.51: Breast Feeding

	NIP	INF	IVF
affirmative	6	5	6
negative	2	3	2

Breast feeding does not differ in the three groups.

Table 7.52: Feeding and Sleeping Problems of Infant

	NIP		INF		IVF	
	FEED.	SLEEP.	FEED.	SLEEP.	FEED.	SLEEP.
affirmative	2	2	1	0	2	1
negative	6	6	7	8	6	7

No differentiation between the groups is shown; most mothers in the three groups encountered no feeding or sleeping problems with their infants.

Table 7.53: Introduction of Solid Food in Infant's Diet

	NIP	INF	IVF
no difficulties	7	8	8
difficulties	1	0	0

The results demonstrate no differentiation between the groups. Most mothers in all three groups did not encounter any difficulties when they introduced solid food in the infant's diet.

12. PSYCHOLOGICAL TESTS ADMINISTERED

As is explained in the Procedure section (Chapter 5, p.65) three tests were administered to the families participating in the study. The Edinburgh Depression Scale (EDS) was administered to all mothers, in order to exclude from the research project any mother who was experiencing depression. The Recent Experiences Scale (RES), which was also given to all mothers in order to ensure that in the last months none had experienced highly stressful life events. The Bayley Scale of Infant Development (BSID) was administered to each infant in order to establish that all infants participating in the study were developing "normally". The means and ranges of each test are presented below in Table 7.54.

12.1 The Edinburgh Depression Scale (EDS)

The scores obtained on the Edinburgh Post-Natal Depression Scale (Table 7.54) indicate that no mother suffered from depression . The IVF mothers had a mean score of 6.5, and the range was from 1-11. The INF mothers had a mean score of 7 and the range was from 0-11 while the NIP mothers had a mean score of 5.5 with a range of 2-11. Research shows that women with a score above a threshold of 12/13 are most likely to suffer from a depressive illness (Cox et al., 1987).

12.2 The Recent Experiences Scale (RES)

The stressful life events experienced by the women participating in the study was estimated with the Recent Experiences Scale (Table 7.54). The mean score for the IVF mothers was 133.37 while the range was between 0 - 245. The mean score in the INF group was 110.87 while the range was between 0 - 183. The mean scale for the NIP group was 176.37 and the range was 0 - 270. Although a moderate degree of stress is reported by some women in all groups, no mother had experienced an unusually high number of stressful events as no mother had a score of above 300 which is considered as being indicative of high stressful life experiences (Giakoumaki, 1992).

12.3 Bayley Scales of Infant Development (BSID)

The development of infants in all three groups was "normal". The mean score obtained by IVF infants on the Bailey Scale of Infant development was 90.25 while the range was 85 - 110. The mean score for the INF group was 90.37 while the range was between 85 - 100. The mean score for the NIP group was 90.37 with the range being between 85 - 118. A score range of 85 - 114 is considered as indicating normal development (Bayley, 1984).

Table 7.54: Results of Psychological Tests

	NIP		INF		IVF	
EDS	Mean	Range	Mean	Range	Mean	Range
	5.5	(2 - 11)	7	(0 - 11)	6.5	(1 -11)
RES	176.37	(0 - 270)	110.87	(0-183)	133.37	(0-245)
BSID	90.37	(85 - 118)	90.37	(85 - 100)	90.25	(85 - 110)

CHAPTER 8

DISCUSSION AND CONCLUSIONS

From the analysis of the findings summarised in the previous chapter, only those results which reach a statistically significant level, or which show an interesting trend, will be discussed in the present chapter.

The aim of this thesis was to study parent-infant communication in families which have been formed as a result of IVF, and to follow this communication through the first five months of the infants' lives. However, before we examine any differences between the three groups of mothers, it is necessary to clarify general developmental changes in the infants' behaviour in all groups, and the ways the behaviours of the mothers adapt to their infants' changing motives and awareness. First, the effects that were common to subjects from all three groups will be examined to clarify both the ways infants regulate their behaviours, and the ways their mothers respond. The findings from this discussion will facilitate both the interpretation of the significant differences observed in the episodes between the three groups -- IVF, INF and NIP -- and the assessment of the implications of these differences for IVF families. The findings from the Interview data are next discussed, and the chapter concludes with an estimation of the contribution of the present study, and offers suggestions for future research.

1. EFFECTS OF INFANT AGE ON BEHAVIOURS OF INFANTS AND MOTHERS

In this section the significant changes in the occurrence of behaviour episodes as a function of infant age are discussed. Developmental changes in the ways infants behave affect the communicative patterns of both mothers and infants.

1.1 Differences in Maternal Episodes

The mothers' 'Affective' episode and the 'Play' behaviours change significantly with the child's age. Mothers seem to play more with their infants as their infants become older, while they demonstrate more affective behaviours when their infants are very young. In order to understand why mothers are influenced by the infant's age, it is important to consider these changes in the light of important developmental changes commonly observed in infants' behaviour in the second month after birth. Until about the age of 4 weeks, infants are considered to be in the neonatal period in which neonates often show tension or fussiness, and they frequently interrupt the pattern of communication with their caregivers by signalling distress. A responsive partner replies by cuddling, stroking or talking softly in order to calm this distress, and consequently affectionate maternal behaviour is at its peak during the 4-week period. At about 5 - 6 weeks of age, during the period that Trevarthen calls Primary Intersubjectivity (already discussed in Chapter 3), infants become more interested in playful 'conversational' communication, and responsive mothers adapt by becoming themselves more playful. The changes observed in mothers' caregiving and playful behaviours can be seen to be adaptors to the psychological development of their infants.

1.2 Differences in Infant Episodes

The three infant behaviour episodes that show a significant age effect are 'Talk', 'Play' and 'Sleep'. The time infants spend in playing increases as they become older.

'Play' behaviour is recorded as early as the 4th week, but its occurrence then is limited, and continually increases up to the 21 week period. As has been explained in Chapter 3, around 6 weeks infants smile, their coos become stronger and they are becoming more playful. This change is clearly seen in the increase of the play behaviour in our subjects. 'Sleep' shows the expected decreasing trend, while an interesting pattern is observed in 'Talk '. Talk episodes are present from the beginning but, as expected, this form of

behaviour is initially rare and increases with the child's age, reaching its maximum at 13 weeks, and thereafter significantly decreasing to 21 weeks.

This apparent regression at first seems surprising. However, as Trevarthen (1982) reports, during this period, although it may have been expected that infants would vocalise and smile more, the opposite is often observed and vocalisations may at this age be greatly reduced while the infant exhibits a new focus of attention on surrounding objects and events. Infants at this age are becoming less interested in face-to-face communication, shifting their curiosity from the responsive partner to the surroundings, and, therefore, they often vocalise less.

2. DISCUSSION OF THE CORRELATIONS

2.1 Correlations in the Maternal Episodes

Obviously, as infants and mothers are sensitive and responsive to one another correlations will be observed in the behavioural episodes of both mothers and infants, and these correlations will change with the infants age.

From the correlations observed in the 4-week-age period it emerges that, when mothers are involved in 'Caretaking 'and in 'Affective' episodes, they do not talk. This pattern changes from the 7-week period onwards when it becomes evident that the more mothers 'Play' the less they 'Talk'. This continues when the infants are 13 and 21 weeks of age. It seems reasonable to assume that two distinct "types of mothers" may emerge: one more involved in talking -- the "talkative" ones, -- while the other type is more active -- the "playful" ones. The explanation for the emergence of this trend -- the more they play the less they talk -- from the 7 weeks onwards is that it is at that time that maternal play becomes more noticeable (Table 7.29, p. 114). The above finding could mean that the functions of talk and play serve the same purpose in the interaction ; i.e., to communicate to the infants supportive and encouraging emotions in the responses of a partner who shows "appropriate empathy" (Trevarthen, 1990b, p. 695). In reaching out emotionally some mothers talk more, whereas others are more inclined to play.

2.2 Correlations between Infant Behaviours

The first significant correlation observed in the 4,7 and 13-week age- period is the trivial negative correlation indicating that the more the infants are attending, the less they are not attending. At infant age of 21 weeks, the correlation between the episodes 'Attending' and 'Not Attending' is still negative but it fails to reach significance. This is expected since at this age-period when infants are attending they are very often also involved in other increasingly complex activities. For example, they may be involved in playing -- and in fact the 'Play' episode at 21 weeks is negatively correlated with 'Not Attending'. During the 4-week period we observe that the more infants are protesting the less they are attending. This correlation is expected because infants, when distressed, do not direct their attention to objects of interest, but rather turn around and shift their eyes to different loci in the environment, or they cry and have their eyes closed. When the 'Talk' behaviour of the infant becomes more evident at 13 weeks, it is also negatively correlated with 'Not Attend', showing that, the more infants talk the more they show focused attending

2.3 Correlations between Maternal and Infant Behaviour Episodes

We observe at infant age 4 weeks an increase in maternal play which is correlated with an increase in infant attention. This is an obvious relationship since mothers are more likely to play with their infants when they are paying attention to them. Besides, we also note in both the 4 and 7-week period that when infants are protesting the mothers are not involved. A plausible interpretation for this correlation is that a protesting infant often makes a mother uneasy and she may react by becoming not involved.

At 13 weeks infants rarely exhibited protesting behaviour and no correlation was observed. However, in the 21 week-age group we observe a significant relationship between infant protesting and the mother caretaking. This change could reflect the different meaning of protesting at 21weeks, compared with its meaning at the earlier age periods. For the younger infants, protesting implies either that the infant is tired, and does not want to communicate any

longer, or that some physiological need is causing distress. In the former case the mother will probably respond by not intruding, allowing the infant time to re-establish communication -- hence she appears 'not involved'. In the latter case she attempts to comfort the infant. However, it is sometimes difficult for a mother to identify the reason for the fussiness of her child. This incapability in identifying what annoys her child is likely to make the mother feel so uneasy that she may become 'not involved'. A 21 week old infant is much more likely to protest because he or she is no longer interested in communicating with the mother but is more interested in surroundings.

It was observed in the videos that, when mothers insisted on communicating with their infants in the same way as they did when the infants were younger -- perhaps because the instructions given to mothers from the researcher were identical in all age groups -- the infants frequently protested. The mothers then responded by employing many caretaking activities to calm their infants. Some of them gave the baby a drink, while others changed the infant's position. By employing these behaviours they often managed to make the infant forget the focus of interest and pay once more attention to the mother hence, communicate with her once again. Therefore, the meaning of the infants protesting in different ages appears to vary requiring thereby a different response from the mother.

In the 4-week age-group a significant correlation is shown between infant 'Sleeping' and maternal 'Affective' responses, whereas at 7 and 21 weeks infant sleeping is correlated with maternal caretaking. A reasonable interpretation for this variance appearing in the different ages is that when 4-week old infants fall asleep, their mothers know that they cannot make them communicate, even if they wake them up, and consequently they respond by becoming affectionate and caregiving: they caress, kiss or hug their babies. In the two other age groups they feel that if they wake them up they might get them to communicate once again. To do this, they employ a variety of more stimulating caretaking behaviours, such as changing the nappy, or changing the infant's position, thereby moving the infant and often succeeding in waking him or her up.

A significant correlation is also seen between the infant 'Not Attending' episode at 7 weeks and the maternal 'Affective' episode, whereas in the 21-week period infant 'Not Attending' is correlated with maternal 'Talk'. This may imply that the withdrawal of attention serves a different function in the two age groups: in the 7-week period maternal 'Not Attending' reduces the state of the infant's arousal, whereas, at 21 weeks it increases the baby's arousal level. Infants at 21weeks, as already mentioned, often prefer to explore surroundings rather than to become involved in communication. With younger infants, mothers employ comforting or gently appealing behaviours to reduce the baby's arousal level and to elicit responses, but at 21weeks they employ more animated talk. The type of phrases, they employ are for example : "Why won't you look at me" or "Look at mummy". Thus, the behaviour coded as "Talk" in this age group mainly consisted of calls for attention. This finding is in perfect agreement with previous research which indicates that after reaching three months, infants, prefer to explore their surroundings and often refuse to look at their mothers (Trevarthen, 1977; Trevarthen & Marwick, 1986).

An interesting relationship is evident at 13 weeks. The more the infants talk, the more the mothers talk, and furthermore the more the infants play, the more the mothers play too. This shows the "dialogic" nature of their communication, which involves much imitation. In the next age group -- at 21 weeks -- when infants are more playful, but less talkative, a significant correlation is only found between infant and mother play.

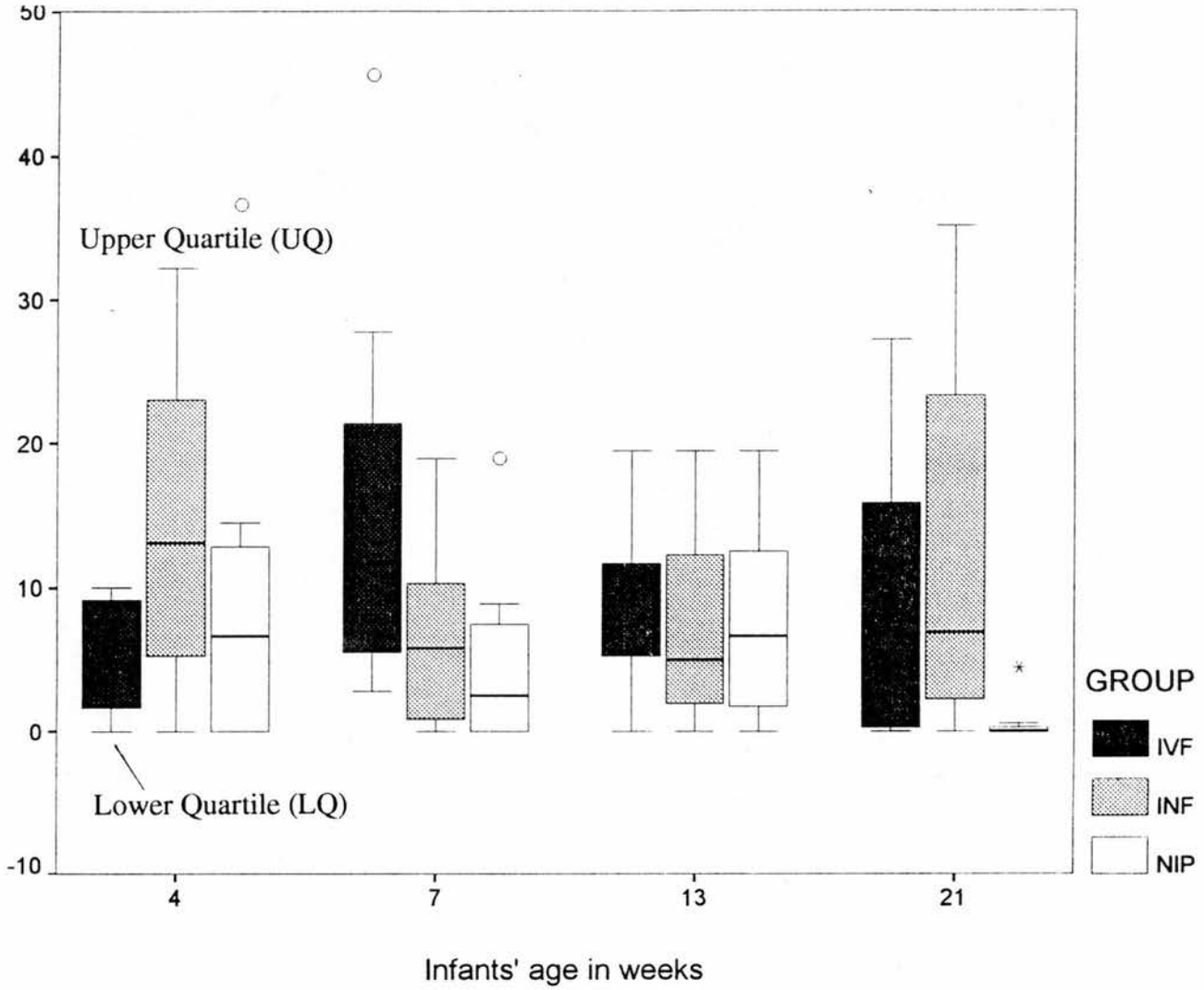
In conclusion the episodes influenced by infant age were "Talk", "Play" and "Sleep". The maternal episodes influenced by the infants developmental changes were "Play", which increased as the infants became more attentive and 'Caretaking' which was associated with infant 'Protesting' . Furthermore, it was also observed that when infants were very young and they fell asleep their mothers became affective whereas in following weeks when infants fell asleep mothers employed 'Caretaking' behaviours. Lastly, infants 'Not attending ' initially was observed together with maternal affectionate behaviours while subsequently with maternal 'Talk'.

3. DIFFERENCES IN THE BEHAVIOURS OF THE THREE FERTILITY GROUPS

3.1 Comparison of Maternal Episodes in the Three groups

No significant differences are identified in the maternal behavioural episodes between the three groups. However, an interesting trend is observed in 'Caretaking'. Before discussing this it is useful to recall the definition employed of 'Caretaking' behaviour. In Chapter 6 section 2.4. Caretaking is defined as "any parental action or combination of actions that is concerned only with the infant's bodily needs, or is performed in order to calm distress".

Figure 8.1 : Percentage of Time of Maternal Caretaking Behaviour, as a Function of Infants' Age and Mothers' Treatment Group



Note : o = outliers
* = extremes

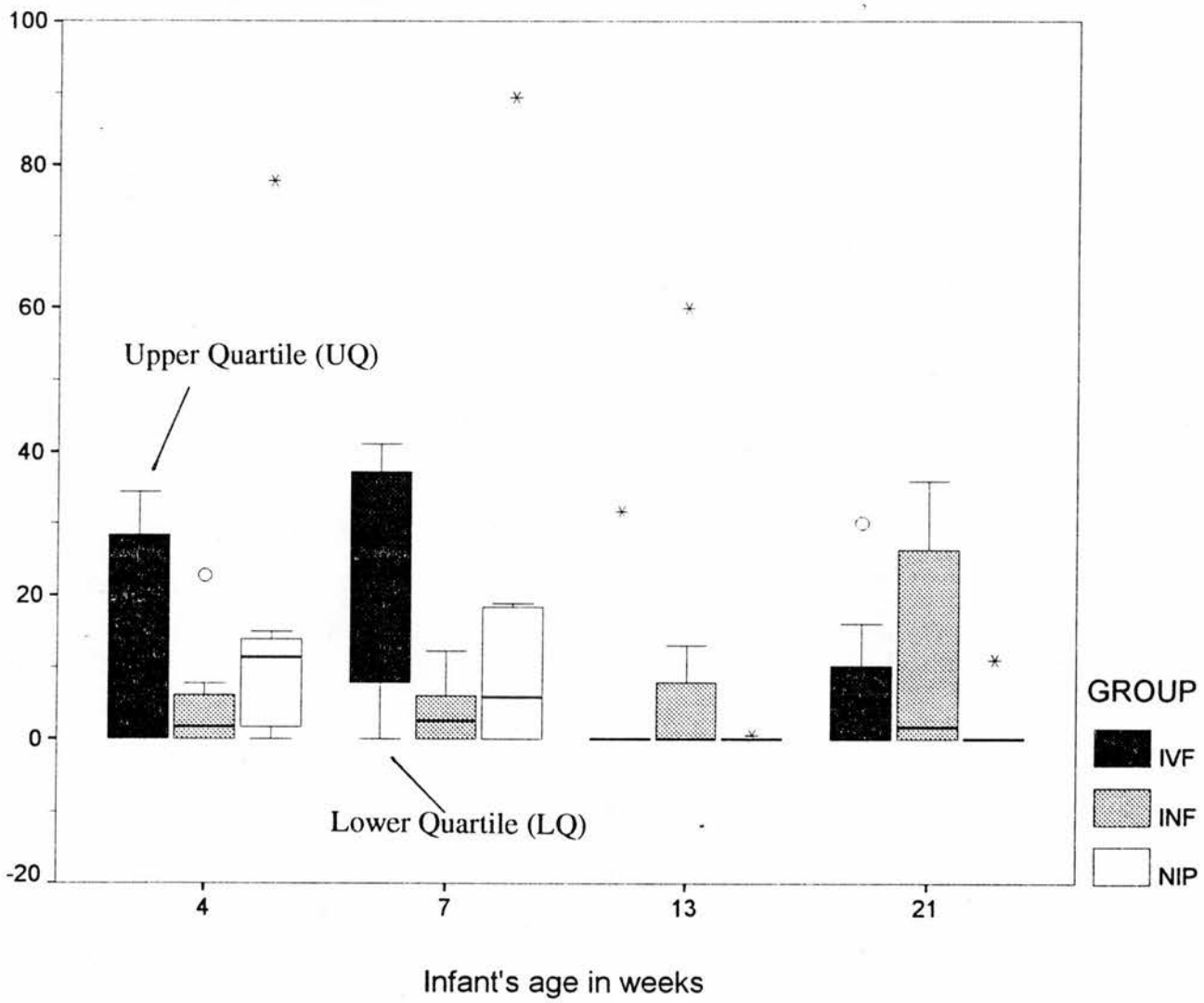
Upper Quartile (UQ) : The data value located halfway between the Median and the highest data value.
Median: The data value located halfway between the smallest and largest values
Lower Quartile (LQ) : The data value located halfway between the Median and the lowest data value
Interquartile Distance (IQD) : The distance between the upper and Lower Quartiles (UQ-LQ).
Outliers : Points whose value is either > UQ + 1.5 * IQD or < LQ - 1.5 * IQD (KaleidaGraph, reference guide,3rd ed. Synergy Software, p.81)
Extremes : Points whose value is either > UQ + 3 * IQD or < LQ - 3 * IQD

For easy comparison between treatment groups, behavioural data are presented graphically. Box plots show medians and quartiles. Detailed information can be found in Chapter, 7, Sections 3.1, 4.2, 4.5 (Tables 7.21, 7.29 and 7.32).

Figure 8.1 presents the percentage of time of maternal 'Caretaking' behaviour as a function of treatment group and infant age. As can be seen, the most conspicuous difference observed between the groups in regard this episode is that the age parameter does not affect all three groups in the same way . This complicating age effect possibly accounts for the fact that, although the difference between the groups is clear, it fails to reach statistical significance overall. More specifically, mothers in all groups spend a considerable amount of time in caretaking behaviours at infant age 4,7 and 13 weeks. Then, this pattern changes at infant age 21weeks, but only for mothers in the NIP group, who at this stage are practically no longer involved in 'Caretaking'. In contrast, mothers in the INF and IVF groups continue to be involved in 'Caretaking' at infant age 21weeks as much as at earlier ages.

As stated, earlier, a significant correlation is observed at 21 weeks between maternal caretaking and infant protesting and sleeping. Mothers are likely to employ what we have defined as caretaking behaviours when their infants are distressed or sleeping. Infant sleeping at 21 weeks is rare as can be seen from chapter 7 section 4.6 (Table 7.33). The same is true for infant protesting.

Figure 8.2 : Percentage of Time of Infant Protest Behaviour as a Function of Infants' Age and Mothers' Treatment Group



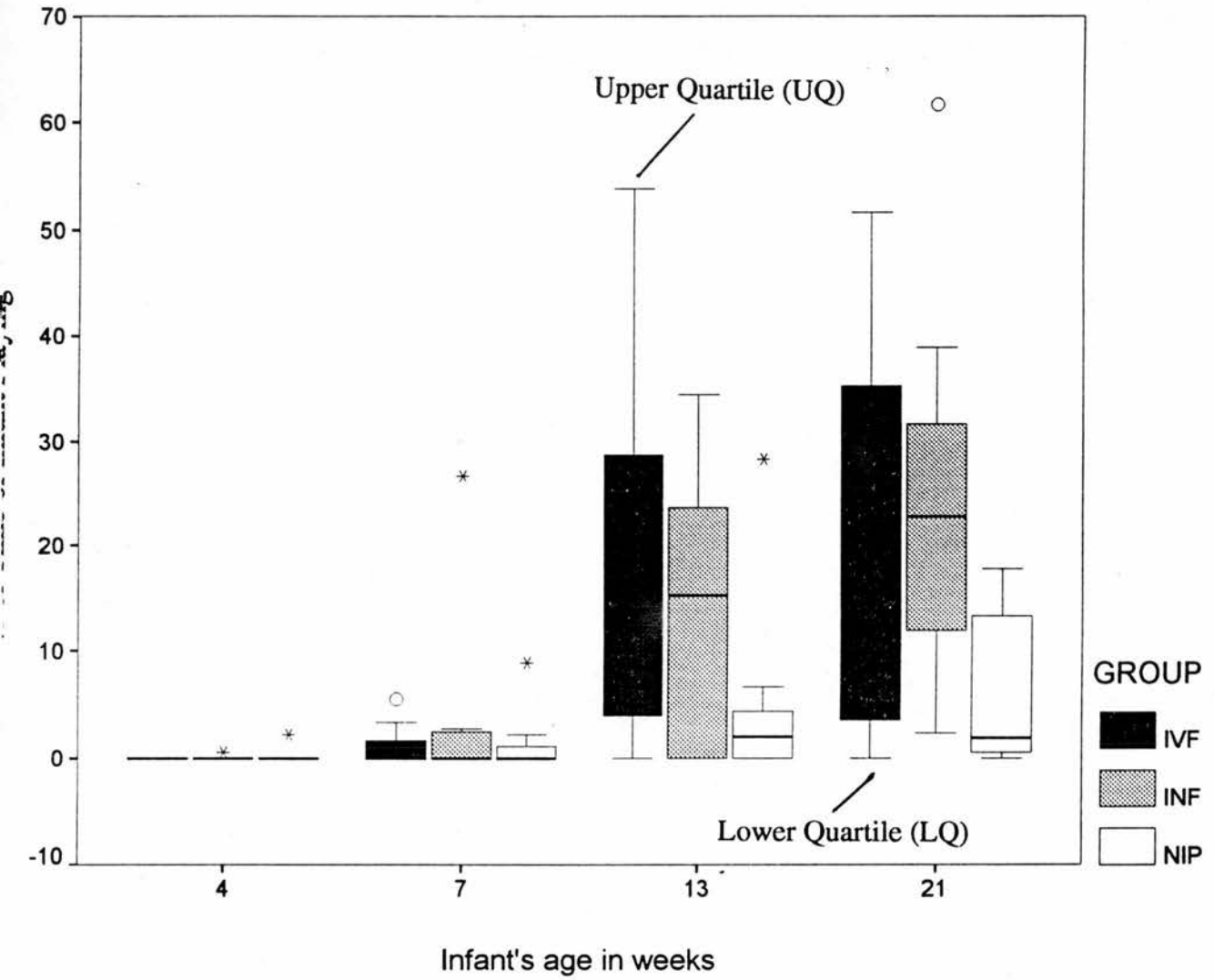
Note : o = outliers
* = extremes

Figure 8.2 represents the percentage of time of infant 'Protesting' behaviour as a function of infant age and group. It displays the tendency of infants in both the INF and IVF groups to protest more than infants in the NIP group. This difference between the groups does not reach statistical significance, and it thus cannot be concluded that INF and IVF infants are more protesting as a group than NIP infants. The conclusion that INF and IVF mothers employ more caretaking behaviours to calm infant protesting is therefore not warranted. Since the number of subjects in the present study is limited and the behaviours of different mother - infant pairs are so variable, only tentative conclusions can be reached. Research, employing larger number of subjects will be required to test the indication that maternal caretaking is extended up to infant age 21 weeks in families which have experienced infertility before conception. An alternative interpretation could be that mothers in the INF and IVF groups have become more sensitive as a result of their extended infertility experience and, therefore, they detect all infant cues indicating some kind of need and hasten to fulfil it. This interpretation is in agreement with Golombok (1990. 1995, Golombok et al., 1996) who shows that quality of parenting in families with a child conceived by assisted reproductive technologies is higher compared to that of families with a "naturally" conceived child.

3.2 Comparison of Infant Episodes in the Three Groups

Most infant behaviour episodes do not show differences between the fertility groups. The only significant difference observed between the groups is in infant 'Play'.

Figure 8.3 : Percentage of Time of Infant Play Behaviour as a Function of Infants' Age and Mother's Treatment Group



Note : o = outliers
* = extremes

Figure 8.3 shows the percentage of time of infant play behaviour as a function of infant's age and the mother's treatment group. As can be seen infants in both the INF and IVF groups play more than do infants in the NIP group. Before attempting to understand what this evidence may indicate, it is important to stress that the absence of any significant difference between the INF and the IVF groups that was observed in the maternal episodes is repeated in the infant episodes, indicating once again that IVF *per se* does not seem to affect mothers or infants. If anything does affect them, it is the infertility experience which precedes conception, however conception is achieved.

In seeking to explain the increased play behaviour observed in the infants of the two infertility groups it is important to briefly review the significance of play in infancy. Play has been approached and studied from different theoretical positions: from a historical, anthropological, philosophical, psychoanalytic, evolutionary, ethnological, cognitive, linguistic and communicative theoretical points of view (Sutton-Smith & Kelly-Byrne, 1984). In this thesis a communicative theory is briefly surveyed because it appears to be most relevant to the way play has been coded in the dyads observed.

Vygotsky (1978) emphasised the social and affective role of play and stated that play "fulfils children's needs"(p. 92). He considered play as the source of development that is created in the "zone of proximal development", which refers to the functional space between what the child can do on his/her own and what the child can do with assistance. Vygotsky stated that every psychological function, including play, appears "first on the social level... between people...and then on the individual level...inside the child"(p. 57). Playing according to Winnicott (1991, p. 41) facilitates "growth and therefore health", while for Trevarthen (1993b) the key component of play is "exuberance", or active and free exercise of motives for experience and exploration, (p. 4). This "exuberance" is reflected in the definition employed in the present thesis for observing the occurrence of play in young infants who are observed playing without using toys (Chapter 6, section 1.3).

Infants in both the IVF and INF groups play more. This would seem to mean that they are more communicative, more "exuberant", more "happy" than infants in the NIP group. An explanation for this finding could be found in the way the mothers of these infants communicate. They may be, in some subtle way, more engaged with their infants and thus elicit more active communication from them. The increased maternal caretaking observed in mothers of the INF and IVF groups is experienced by the infants as greater engagement. If it were experienced differently -- for instance as "too much", or as an intrusive behaviour -- it would have elicited behaviours indicating disengagement on the part of the infants.

As mentioned in Chapter 3, theories on infant development have evolved. The initial view of the infant as an immature biological organism which merely expresses drives to regulate body states gave way to the belief that infants, and even neonates, are much more competent human beings. This realisation altered the view that the infant's communicative behaviour is diffuse and therefore its role in dyadic communication is unimportant and the interaction is solely dependent on the adult's control of the infant's bodily needs. Today, the standpoint is that the infant's communicative behaviour is organised and, therefore, both members of the dyad are equipped to 'take account' of the other while specific motives in the infant's brain ensure that from birth the infant will engage with motives in other brains (Trevarthen, 1980 b). Emotions constitute an innate system of matching and regulating intersubjective states (Trevarthen, 1984). "The infant's 'self' is organised to develop in interaction with 'others', as well as in self-contained endeavour and experience" (Aitken & Trevarthen, 1997, p. 653). In agreement with Trevarthen, Weinberg & Tronick, (1997) propose that intersubjectivity ensures more complex and coherent dyadic consciousness and that the infant is motivated to communicate with 'others' and to establish intersubjective states in order to construct meaning and that this ensues normal development. Thus, the goal of mother - infant interaction is not the regulation of the infant's bodily states or the "expression of affective bonding" (Papousek & Papousek, 1997, p. 44) but the creation of dyadic states which enable infants to create meaning and to acquire knowledge about events and objects. The success or

failure of this endeavour depends on biological factors within the child, i.e. on the child's capacity to control physiological states, on the integrity of the infant's communicative system which insures that the child's messages will be communicated and on the caretaker's capacity to successfully 'read' these messages and to willingly respond to these (Tronick & Weinberg, 1997). In smooth communication each member of the dyad is sensitive to the cues emitted by the other and adjusts his or her behaviour in relation to the other. When communication fails infants are distressed, they look away from mothers and cry excessively. Mothers who do not act in an appropriate way and do not adapt their communicative style to their infant's needs have babies who refuse to communicate with them (Papousek & Papousek, 1977; Tronick et al., 1978). Furthermore, when maternal behaviour is appropriate but is inappropriately timed, the infants exhibit behaviours indicating protesting and eventually withdraw from communication (Murray & Trevarthen, 1985; Trevarthen, 1993a). In agreement with the above mentioned researchers, Papousek & Papousek (1997), suggest that the interplay of infant and parental predispositions which interact with internal affects in intimate interactions ensue the development of communication. Thus, mother - infant communication is today viewed by researchers as a system mutually organised from the first weeks of the infant's life.

The findings of this project suggest the following. First, mother-infant communication and infant development of infants born by IVF is essentially "normal". Second, IVF *per se* does not greatly influence either communication or development; and, third, that the experience of infertility seems to be stimulating maternal 'Caregiving' and infant 'Play'. Golombok (1995) reports that IVF parents are 'warmer 'with their children and show greater emotional involvement than parents with a "naturally" conceived child. Warmth in the above study was determined by the mother's tone of voice and facial expression when addressing the child, as well as, sympathy and concern about difficulties experienced by the infant and interest in the child as a person. Emotional involvement was based on the extent to which the mother was over concerned or overprotective with the child. In Golombok's study the children were between 4 and 8 years old. In the present study, young infants were observed. The reported increased involvement and warmth observed in Golombok's study with older children can be considered

as analogous to the increased caretaking behaviour episode observed with young infants. 'Caretaking ' was defined in the present study as " any parental action or combination of actions concerned with the infant's bodily needs, or performed in order to calm distress" (Ch. 6, section 2.4). This definition implies that the parent feels concerned with "difficulties experienced by the infant" and responds to these.

Clinicians and researchers have extensively studied the effects of parental negligence as well as the effects of a non-supportive, non responsive human environment on the infant. It was shown -- and discussed in Chapter 3 -- that an indifferent, hostile or rejecting parent may seriously affect a child's development. The present study, in agreement with previous studies suggests that mothers who have conceived after standard infertility treatment or by IVF appear to be "superior" to mothers who do not have this experience. Before concluding that this superior behaviour is positive for infant development, the view of some clinicians who have voiced concern about the effects of an over responsive human environment should be considered.

Mothers who feel that their lives are totally devoted to their children could become 'overprotective'. Overprotection has been defined as synonymous to "excessive maternal care" (Levy, 1970, p. 392). Among the factors leading to overprotection, prolonged anticipation of pregnancy is mentioned. Furthermore, it has been asserted that mothers who have experienced long periods of infertility are more protective than those who have not had this experience. The problems resulting from overprotective parents are not always evident in early parent-child relationships but may become apparent in adult life (Levy, 1970). It has also been stated that high tracking in mother-infant vocal dialogues is an index of vigilance, of over-monitoring, wariness or over-alertness (Beebe & Jaffe 1992). In other studies high tracking has been found in disturbed marital relationships (Gottman, 1981) and between mothers and their premature infants (Crown, 1991). Furthermore, Kohut (1977) mentions that certain people who develop problems later as adults appear to have had extremely devoted mothers in their early life. Winnicott (1960) also states that the "good enough mother" must eventually be in a position to frustrate her baby because "The infant can be disturbed by a close adaptation to need that is continued too long"(1991, p. 11).

The results of the present study indicate that mother-infant communication in IVF families follows the "normal" developmental path. Furthermore, this study also shows that the few differences that are identified between the NIP group and the IVF group are also found between the INF group and the NIP group. This implies that while the infertility experience may influence a few aspects of the communicative pattern, IVF as such does not influence in any measurable way mother-infant communication. As in the era of the new technologies applied in reproduction, the focus of attention of both researchers and clinicians has moved from the generic effects of infertility to the implications of the particular new technology, this finding is considered to be very important

4. DISCUSSION OF THE INTERVIEW DATA

The number of couples participating in the study are limited and, in consequence, general conclusions cannot be drawn from the answers given on the Interview Schedule. Consequently, the results discussed below can only serve as indications of trends.

4.1 Summary of Findings regarding the Marital Relationship

According to the reports given by the families participating in the present study, most couples in all three groups rate their marital relationship as being very good. However, women in both the IVF and the INF groups report that they quarrelled less often with their partners than did women in the NIP group. Most couples in both the INF and IVF groups report that their rapport improved with the arrival of the infant, whereas most couples in the NIP group report that their marital relationship deteriorated with the birth of the infant. Taking into consideration that the period following the birth of an infant is widely accepted as a period of change and stress for any couple, which requires adjustment by all members of the family (LeMasters, 1957), it is interesting to note that couples who have experienced infertility do not perceive this period as negatively affecting their relationship.

A possible explanation for this difference observed in both the INF and the IVF groups could be that the preceding period of infertility was strenuous and so much affected their marriage that the advent of the infant alleviated stress instead of producing it. However, this interpretation does not seem plausible, because couples in both the INF and IVF groups report that the infertility experience brought them closer to one another, and they do not admit that this experience had any negative effect on their relationship. It is possible that the difference in experience between the INF and IVF couples regarding the effect of the infant's birth on their relationship could indicate that the couples who, mostly report feeling very distressed (Table 7.40), during the infertility period found ways of coping with stress and tension, and consequently their relationship became deeper with more understanding and thus they were more capable of overcoming or even eliminating the effects of stress created by the birth of the infant. They do not view their child so much as an "intruder" but as always present, as is reported by the woman who claims that her son always existed in her mind (Bainbridge, 1982, p. 120, In : Sandelowski, 1993, p. 1). This interpretation is strengthened when we consider the fact that couples in both infertility groups have been married longer than couples not previously infertile, and the longer time they have been together may have positively influenced the quality of their relationship. Another possible interpretation could be that couples who experienced infertility came to idealise the period following the birth of their infant and do not wish to admit -- even to themselves -- any difficulties encountered as a result of the arrival of the infant, including marital ones. However, there is no indication from the present Interview Schedule for such an idealisation. From the examination of the present Interview data it is not possible to identify the underlying cause which leads previously infertile couples to describe their marital relationship in more positive terms than couples who have not been infertile. However, it is important to mention that this finding is well in agreement with research that has reported that IVF parents experience fewer marital difficulties than do couples with a naturally conceived child (Golombok, 1995). This finding is crucial when considering mother-infant communication, since the quality of the marital relationship is judged to be the most significant factor in determining how successfully a mother will adapt during the postnatal period (Shereshefsky & Yarrow, 1973).

The sexual relationship of most couples in the NIP and INF groups is reported not to be affected by the birth experience, whereas some couples -- and more women -- in the IVF group report that their sexual relationship was affected by the advent of their baby. This difference between the two infertility groups (INF and IVF) could be attributed to the variation which exists in the way conception occurs. The IVF method *per se* excludes sexual intercourse from reproduction, whereas in the standard infertility treatment employed in the INF group, conception occurs after sexual intercourse. It has been reported that a side-effect of this factor is that IVF couples neglect their sexual life (Koeppel, 1992). Consequently, it is possible, that this neglect continues for some time after the birth of the infant before the sexual life of these couples is fully restored. Previous research, discussed in Chapter 1, reported that infertility may affect the couple's sexual relationship. Besides the neglect of their sexual life, the separation of the sexual act from procreation has another consequence, namely a form of mourning that couples experience because the project of the infant is not actualised as anticipated (Roegiers, 1994). From the eight IVF couples participating in the present study, one husband described at length that he felt something was "missing" because his child was not the result of the couple's sexual relationship. He even said that he was still mourning although he was extremely happy to have his son and that even after the advent of the baby, he was still month after month longing for a child that would be conceived by the "normal" way. He felt that the way their baby was conceived was the second best way.

4.2 Summary of the Findings regarding the Infertility Experience

Participants in both the INF and IVF groups describe themselves as having been very distressed during the infertility experience. These feelings are more evident in women, in both groups. This finding agrees with research regarding infertility which shows gender differences on the effect of infertility (Platt et al., 1973; McEwan, 1987; Wright et al., 1991; Balen et al., 1995). The answers given concerning the effect that the infertility experience has on the sexual relationship indicate that for about half of the participants in both infertility groups the infertility experience negatively affected their sexual relationship, whereas for the other half, it had no effect. The above findings agree with the conflicting findings regarding the effect of infertility on the

sexual relationship which are reported in the literature, and mentioned extensively in Chapter 1.

4.3 Experience of IVF

According to many studies, most IVF couples rate the IVF experience as a demanding treatment (Friedman et al., 1985; McEwan et al., 1987; Seibel & Taymor, 1988; Cook et al., 1989; Mazure & Greenfeld, 1989; Newton et al., 1990; Papaligoura, 1992; Thiering et al., 1993; Harlowe et al., 1996) and they report that the most stressful phase of the treatment is the period extending from the completion of the treatment to the day the outcome is announced (Leiblum et al., 1987; Papaligoura, 1992). Support during the treatment seems to be given almost exclusively by the husbands. It is reasonable to assume that this is another indication of the quality of the marital relationship of the couples in the study. Most participants stated regarding the disclosure of the method of conception that they had discussed IVF either with their family or with close friends. These results are strikingly different from those found in a previous study in Greece (Papaligoura, 1992) in which most couples revealed that they did discuss the method of IVF with anyone. This difference in attitude may very well reflect the limited awareness of the Greek public a few years ago regarding the procedure of IVF. In that study, couples explaining the reason for not disclosing the method of conception mentioned that they were afraid people would not understand what IVF was about. A greater openness regarding IVF is reported recently (Brewaeys et al., 1997).

4.4 Experience of Pregnancy and Delivery

Most couples in the NIP group report that the dominant feeling during pregnancy was happiness. Most couples in the INF group report feeling anxious and happy, while most couples in the IVF group report feeling mostly anxious during pregnancy. This anxiety seems reasonable considering the higher rate of miscarriage and of prematurity associated with IVF pregnancies. Furthermore, research has shown that miscarriage is a major concern in couples who have had an infant through ART - Assisted Reproductive Technology - (Braverman et al., 1997). This prevailing anxiety is also evident in the typical statement which IVF couples make, that none had

sexual intercourse during the nine-month period of pregnancy, whereas this was the case for only three couples in the INF group and for one couple in the NIP group.

When IVF mothers were asked for the reason why they did not have sexual relations during the nine-month period of pregnancy, all stated that they were afraid they might miscarry or harm the baby in some way. In respect to the method of delivery, the higher rate of caesarean sections in the INF and IVF groups is in agreement with other studies (Beral et al., 1990; Friedler et al., 1992; Reubinoff, et al., 1997) and possibly reflects the anxiety of the medical team who view these pregnancies as more "precious" and thus they do not want to take any "risks" (Delaisi de Parseval, 1981).

Most mothers describe the experience of delivery in very positive terms such as "a fantastic experience", "the most important experience of my life". As expected, couples in the IVF and INF group, have the most positive attitudes when describing the delivery experience since this experience leads them to finally actualise their dream.

4.5 The Way the Infant is Experienced

Most mothers in all three groups breastfed their infants. Furthermore, most of them did not report encountering any sleeping or feeding problems with their infants nor did they encounter any difficulties when they introduced solid food to the infant's diet.

4.6 Conclusions regarding the Interview Data

Previously infertile couples adapt well postnatally and do not seem to encounter any particular difficulties with their infants. It is interesting to note that the two infertility groups (INF and IVF) are very similar in terms of their answers -- a fact which was also observed in the microanalysis of communicative episodes with the infants.

5. DIRECTIONS FOR FUTURE RESEARCH

The major contribution of this investigation is the application of a new method for studying IVF families. Building on results of the questionnaires and the interviews of previous research, this thesis reports the application of the new analytical techniques employed in research over the past 30 years in developmental psychology to a study of the communication of mothers and infants born after in-vitro fertilisation. The main motivation for this investigation was to convincingly demonstrate that this detailed method for studying the development of early communication is particularly helpful for understanding communication in families created by IVF. It enables the researcher to accurately observe the effect of IVF on communication between parents and infants. The IVF population has been studied, as already mentioned, with questionnaires and interviews, however, the direct observation has the advantage of observing a large number of communicative exchanges that may escape parental awareness and thus not be reported in questionnaires and interviews.

The findings support the evidence obtained from previous research employing standardised questionnaires and in depth interviews, leading to the conclusion that, although IVF is a stressful procedure it does not have any threatening effect for parents or infants and actually stimulates parenting. In this investigation there was no difference between mothers up to infant age of 13 weeks. After this age infertility and IVF mothers were found to be more involved in caretaking than mothers who had not experienced infertility. Regarding the infants, those born by infertility treatment and IVF are found to be more playful. This difference is constant from the time play is evident. Furthermore, the interview data agree with most studies regarding the effect of infertility, the experience of IVF and its effect on the marital relationship, as well as the experience of pregnancy and delivery.

However, due to the limited number of families who participated in this study several questions remain unanswered. It was not evident whether the differences observed between the infants are influenced by the infant's sex. Further, while fathers were also observed, they were seen only in one age group to obtain a brief parallel view of the whole family system. In future

studies it is suggested that fathers should be included and studied as intensively as mothers in order to understand the exact way both parents are influenced by assisted reproduction. A further important finding of the present study is that IVF families do not differ from previously infertile families. This finding is in agreement with the few previous studies. Since this finding is supported both by maternal and infant communication behaviour indices and is also noted in the answers given on the interview schedule it is suggested that studies which have focused on IVF families, should be extended to families which conceive by standard infertility treatment . It appears that infertility itself influences parenting and infant communication significantly.

The decision to visit few couples but to observe them longitudinally was adopted with the aim of observing whether the groups follow a different developmental path in communication. Actually, regarding the caretaking behaviour of mothers, the difference between the groups would not have been apparent had the dyads been visited only up to infant age 13 weeks.
Future work, should apply this microanalytic method to a larger number of subjects throughout the period of infancy. Larger studies will be needed to determine whether there is a sex difference in the observed increased communication in infertility and IVF infants, and the importance of other individual differences in infants and parents and will enable the clarification regarding the finding of greater maternal caretaking observed both in infertility and IVF mothers.

It becomes evident more and more that IVF and INF parents seem to be "superior" in their responses to infants and young children. It is clear that the life-long effects of this intensification of parenting behaviour on children should also be considered.

6. CONCLUSIONS

Infertility has always been considered a many-faceted problem. The social, the psychological, the medical, the economic as well as the moral aspects of infertility weigh heavily on those who experience it. This dissertation could

not deal with more than one small part of the vast terrain of the problems related to infertility. Namely a very specific aspect of the experience of infertile women who became mothers with IVF. It was concerned with the early progress of the relationship between the mother and her baby, and with certain changes brought about in the family to which the infant has come by this artificial means.

Nevertheless, the research carried out, limited as it is does suggest conclusions of broad interest. First, the detailed information collected on mother-infant communication provides data on early infant development that corroborates the hypothesis that the infant has an innate predisposition to communicate, which is adapted to develop with the contribution of a sensitive and responsive adult. Infertility treatment, it was found does not necessarily interfere with this contribution; it may even enhance the affection that drives it. The outcome depends heavily on the particular family, independently of the assistance given to reproduction -- on the families emotional strengths and weaknesses, social and cultural support, resources, and many other of the factors that can be important for any family with a new infant. It is encouraging that so many of the IVF infants developed well, and that most of the families were able to compensate for the psychological stresses involved.

The psychologically stressful experience of infertility and IVF, and their likely psychological consequences for the parents and extended family, indicates that those involved in the management of assisted reproduction should keep in mind that they should not limit attention to the medical problem, and disregard the other parameters involved. Rather, they should try to deal with persons affected by the treatment as whole individuals who will be under differing social and psychological pressures, and they should also keep in mind that both infertility and its treatment affect the emotional structure of the whole family. The responsibility of, health care providers is to be supportive and understanding with infertile couples, helping them restore a working balance in their family relationships.

Prevalent social views on child bearing, as well as the way women themselves view their role and function as women and mothers, constitute the context within which priorities are set for research. As a result, the development of

assisted reproductive technology, despite the fact that it captures the public's attention and excites its imagination, has to be placed within the context of the moral debate surrounding it. Some of the major issues in this debate are whether or not the intervention in nature's course is warranted; whether involving a third party, a donor, in the process of conception affects the integrity of the family and, for this reason, should not be permitted; and, lastly, whether the risks involved in the process are justified given the low success rate. An important part of this debate concerns the fate of the surplus embryos created in the course of the treatment. A moral issue, which has psychological and social repercussions, concerns the anonymity of the donors in the cases of Donor Insemination since it may involve secrecy and deception.

Despite the medical, social, psychological, moral and even economic dilemmas to which they give rise, Assisted reproductive technologies will continue to be employed to solve fertility problems and they will be developed further. The inevitable medical progress will result in a wider range of solutions, but also make more acute the controversial issues surrounding their employment. It is only through further research on all aspects of ART that a broader consensus will be achieved to the benefit of all parties involved.

APPENDIX I

I.A. INTERVIEW SCHEDULE FOR NIP GROUP AT INFANT AGE 4 WEEKS

MOTHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

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Occupation: Housewife / Employee / Professional / Unemployed

Married since: ----------

Date of infant's birth : ----------

Infant's Sex : ----------

Method of delivery : ----------

2. Marital Relationship

Your relationship with your husband before you were pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before you were pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your husband before you were pregnant

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period?
If yes until when / if no why not

Describe your feelings while giving birth

Following the birth of your infant your relationship with your husband

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

Following the birth of your infant your sexual relationship with your husband
---

a. remained unchanged
b. changed (how)

Do you breastfeed your baby? ---
Yes / No (if not why not)

Do you experience any difficulties with your baby such as sleeping difficulties, eating difficulties, excessive crying, or serious colic pains) ---
---

Yes / No (if yes specify)

FATHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

----

Occupation: Labourer /Employee / Professional/ Unemployed

2. Marital Relationship

Your relationship with your wife before she was pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before your wife was pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your wife before she was pregnant was

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period?
If yes until when / if no why not

Were you present in the delivery room?

Describe your feelings while your wife was in labour

Following the birth of your infant your relationship with your wife

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in some others
d. deteriorated

Following the birth of your infant your sexual relationship with your wife

---

a. remained unchanged
b. changed (how)

Do you experience any difficulties with your baby such as sleeping problems, eating problems, excessive crying or serious colic pains) ----------
---
Yes / No (if yes specify)

I.B. INTERVIEW SCHEDULE FOR INF GROUP AT INFANT AGE 4 WEEKS

MOTHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

----

Occupation: Housewife /Employee / Professional/ Unemployed

Married since: ----------

Date of infant's birth : ----------

Infant's sex : ----------

Method of delivery : ----------

2. Marital Relationship

Your relationship with your husband before you were pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before you were pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your husband before you were pregnant was

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Infertility Experience

Duration of Infertility ----------

Reason for infertility ----------
a. Tubal factor
b. Endometriosis
c. Ovulation factor
d. Sperm factor
e. Unexplained

How were you feeling during the infertility period? ----------

a. very distressed
b. not very distressed
c. ambivalent

Did you find yourself crying often ----------

Yes / No

Was your appetite normal? ----------
Yes / No

Did infertility affect in any way your marital relationship? ----------

a. It did not affect it
b. It brought you closer to one another
c. It brought you apart

Did it affect the frequency of your sexual relationship ----------
Yes / No

Who supported you most at that period ----------

a. Husband
b. Mother
c. Mother in law
d. Brothers/sisters
e. Friends
f. Other (specify)

4. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period?

If yes until when / if no why not

Describe your feelings while giving birth

Following the birth of your infant your relationship with your husband

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

Following the birth of your infant your sexual relationship with your husband

---

a. remained unchanged
b. changed (how)

Do you breastfeed your baby? ---

Yes / No (if not why not)

Do you experience any difficulties with the baby such as sleeping difficulties, eating difficulties, excessive crying or serious colic pains _____

Yes / No (if yes specify)

FATHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

----

Occupation: Labourer /Employee / Professional/ Unemployed

2. Marital Relationship

Your relationship with your wife before she was pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before your wife was pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your wife before she was pregnant

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Infertility Experience

How were you feeling during the infertility period? ----------

a. very distressed
b. not very distressed
c. ambivalent

Did the infertility affect in any way your marital relationship? ----------

a. it did not affect it
b. it brought you closer to one another
c. it brought you apart

Did it affect the frequency of your sexual relationship ----------
Yes / No (if yes specify)

Following the birth of your infant your relationship with your wife

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

Following the birth of your infant your sexual relationship with your wife
---

a. remained unchanged
b. changed (how)

4. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period? ----------
Yes / No
(If yes until when / if no why not)

Describe your feelings while your wife was in labour

Do you experience any difficulties with your baby such as sleeping difficulties, eating difficulties, excessive crying or serious colic pains) ------
Yes / No (if yes specify)

I.C. INTERVIEW SCHEDULE FOR IVF GROUP AT INFANT AGE 4 WEEKS

. MOTHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

---

Occupation: Housewife /Employee / Professional/ Unemployed

Married since: ----------

Date of infant's birth : ----------

Infant's sex : ----------

Method of delivery : ----------

2. Marital Relationship

Your relationship with your husband before you were pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before you were pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your husband before you were pregnant

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Infertility Experience

Duration of Infertility ----------

Reason for infertility ----------

a. Tubal factor
b. Endometriosis
c. Ovulation factor
d. Sperm factor
e. Unexplained

How were you feeling during the infertility period? ----------

a. very distressed
b. not very distressed
c. ambivalent

Did you find yourself crying often ----------
Yes / No

Was your appetite normal? ----------
Yes / No

Did infertility affect in any way your marital relationship? ----------

a. it did not affect it
b. it brought you closer to one another
c. it brought you apart

Did it affect the frequency of your sexual relationship ----------
Yes / No

Who supported you most at that period ----------

a. Husband
b. Mother
c. Mother in law
d. Brothers/sisters
e. Friends
f. Other (specify)

4. Experience of IVF

After how many IVF trials were you successful? ---------

How would you describe the IVF experience?

Is it a method that you would consider as psychologically demanding ?

Yes / No

Is it a method that you would consider as physically demanding?

Yes / No

Which phase -- if any one -- do you consider as being more stressful?

a. Ovulation induction
b. Oocyte retrieval
c. Embryo transfer
d. Waiting for the results

Who supported you most during the IVF trials ----------

a. Husband
b. Mother
c. Mother in law
d. Brothers/sisters
e. Friends
f. Other (specify)

Have you discussed the method of conception? ----------
(If yes whom with)
a. Parents
b. Brothers / Sisters
c. Close friends
d. Other (specify)

5. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period?
If yes until when / if no why not

Describe your feelings while giving birth

Following the birth of your infant your relationship with your husband

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

Following the birth of your infant your sexual relationship with your husband
---

a. remained unchanged
b. changed (how)

Do you breastfeed your baby? ----------
Yes / No (if no why not)

Do you experience any difficulties with the baby such as feeding difficulties, sleeping difficulties, excessive crying or colic pains ----------
Yes / No (if yes specify)

FATHERS

1. Demographic Information

Name : ----------

Age : ----------

Education : Primary School / High School/ Higher Education /University

----

Occupation: Labourer /Employee / Professional/ Unemployed

2. Marital Relationship

Your relationship with your wife before she was pregnant can be described as most of the time being ----------

a. excellent
b. very good
c. good
d. average
e. unsatisfactory

The frequency of your sexual relationship before your wife was pregnant was

---

a. daily
b. 3-4 times a week
c. 1-2 times a week
d. weekly
e. other (specify)

You quarrelled with your wife before she was pregnant

---

a. never
b. rarely
c. moderately
d. often
e. constantly

3. Infertility Experience

How were you feeling during the infertility period? ----------

a. very distressed
b. not very distressed
c. ambivalent

Did the infertility affect in any way your marital relationship? ----------

a. it did not affect it
b. it brought you closer to one another
c. it brought you apart

Did it affect the frequency of your sexual relationship ----------
Yes / No

Who supported you most at that period ----------

a. Husband
b. Mother
c. Mother in law
d. Brothers/sisters
e. Friends
f. Other (specify)

4. Experience of IVF

How would you describe the IVF experience?

Is it a method that you would consider as psychologically demanding ?---------

Yes / No

Is it a method that you would consider as physically demanding? ----------

Yes / No

Which phase -- if any one -- do you consider as being more stressful?

a. Ovulation induction
b. Oocyte retrieval
c. Embryo transfer
d. Waiting for the results

Following the birth of your infant your relationship with your wife

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

Following the birth of your infant your sexual relationship with your wife

---

a. remained unchanged
b. changed (how)

5. Pregnancy and Birth

Describe your dominant feelings during the pregnancy period

Did you have sexual intercourse during the pregnancy period? ----------
Yes / No (If yes until when / if no why not)

Describe your feelings when your wife was giving birth

Do you experience any difficulties with the baby such as feeding difficulties, sleeping difficulties, excessive crying or serious colic pains) ----------
Yes / No (if yes specify)

QUESTIONS ASKED AT INFANT AGE 35 WEEKS

ALL GROUPS

1. Do you still breastfeed your baby. If not when did you stop breastfeeding

2. Do you experience any difficulties with the baby such as feeding difficulties, sleeping difficulties, excessive crying or colic pains

3. Was the introduction of solid foods easy? How did the baby adapt?

4. Following the birth of your infant your relationship with your husband

---

a. improved
b. remained unchanged
c. improved in some respects and deteriorated in others
d. deteriorated

5. Following the birth of your infant your sexual relationship with your husband

---

a. remained unchanged
b. changed (how)

1. DEFINITIONS OF BEHAVIOURAL MODALITIES SELECTED FOR CODING IN THE FIRST STAGE - INFANTS AT 13 WEEKS

Mother

Facial expressions

. **Neutral :** expression with eyes normal width, eyebrows normal position
. **Attentive:** eyebrows slightly raised, mouth opened
. **Coo Face:** mouth opening and special shape
. **Smile :** corners of the mouth retracted and eyes bright
. **Negative:** expression of anger or indignation

Body Position

. **Close :** the infant is held parent's arms close
. **Mid :** in parent's arms normal distance
. **Far :** in parent's arms giving the impression of being far from mother

Expressing Affect:

Any physical demonstration of affection. or a combination e.g. holding hand and kissing. Is distinguished from caregiving from the objective of the behaviour. Is distinguished from play again by determining the objective of the behaviour.

Play Behaviour:

Any action or combination of actions that is concerned only with the infant's amusement.

Infant

Facial Expression

. **Neutral:** same definition as for mother
. **Attentive:** eyebrows slightly raised, mouth opened
. **Coo Face:** mouth opening and special shape (Bullowa p.325)
. **Smile:** same definition as for mother

. **Negative expression:** cry, pouting or frowning

Direction of Gaze: Looking at Mother or Not looking at Mother

Head orientation:

. **Facing Mother**

. **Not Facing Mother:** when the head is turned completely away from mother either to the left or right

Vocalisations:

. **Prespeech:** tongue and mouth movements

. **Coo** : pleasurable sounds

. **Negative Sounds:** any sounds which indicate any unpleasurable feeling

CODING SHEET

INTER-VALS	TIME	FACIAL EXPRESSION	DIRECTION OF GAZE	HEAD ORIENTATION	HEAD ATTITUDE	BODY POSITION	EXRESSING AFFECT	CARETAKING ACTIVITIES	GAMES NO OBJECTS	AROUSAL LEVEL	FACIAL EXPRESSION	DIRECTION OF GAZE	HEAD ORIENTATION	HEAD ATTITUDE	VOCALI-SATIONS
1															
2															
3															
4															
5															
6															
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40															
41															
42															
43															
44															
45															

APPENDIX II

Table II.1: Percentage of time Mothers spent in each functional state for the total time of observation in each group

MOTHER	IVF	INF	NIP
Face Expressions			
RELAXED	5.2	8.5	5.4
ATTENTIVE	22.8	38.1	45.7
CALLING	0.8	3.0	2.3
HAPPY	55.2	46.6	40.9
UNHAPPY	0.1	0.1	0.1
OTHER	16.0	3.7	5.7
Body Position			
CLOSE	17.8	26.9	36.5
FAR	6.5	0	1.1
MID	75.7	73.1	62.4
Affect Expressed			
UNEXPRESSIVE	85.6	70.2	70.7
EXPRESSIVE	14.4	29.8	29.3
Play Activity			
SERIOUS	69.5	71.6	81.7
PLAYING	30.5	28.4	18.3

Table II. 2: Percentage of time Infants spent in each functional state for the total time of observation in each group

INFANT	IVF	INF	NIP
Face Expressions			
RELAXED	26.0	19.8	22.2
WATCHING	39.8	38.9	56.7
COO FACE	11.6	15.5	8.5
HAPPY	18.7	13.1	12.3
UNHAPPY	3.9	12.8	0.4
Gaze Direction			
LOOK AT	70.9	55.7	56.5
LOOK AWAY	29.1	44.3	43.5
Head Orientation			
FACING	76.3	62.2	58.5
AWAY	23.7	37.8	41.5
Vocalisations			
NONE	83.2	72.6	88.3
PRESPEECH	4.6	10.7	7.1
COOING	8.1	7.1	4.0
DISTRESSED	4.2	9.6	0.6

APPENDIX II

Table II.1: Percentage of time Mothers spent in each functional state for the total time of observation in each group

MOTHER	IVF	INF	NIP
Face Expressions			
RELAXED	5.2	8.5	5.4
ATTENTIVE	22.8	38.1	45.7
CALLING	0.8	3.0	2.3
HAPPY	55.2	46.6	40.9
UNHAPPY	0.1	0.1	0.1
OTHER	16.0	3.7	5.7
Body Position			
CLOSE	17.8	26.9	36.5
FAR	6.5	0	1.1
MID	75.7	73.1	62.4
Affect Expressed			
UNEXPRESSIVE	85.6	70.2	70.7
EXPRESSIVE	14.4	29.8	29.3
Play Activity			
SERIOUS	69.5	71.6	81.7
PLAYING	30.5	28.4	18.3

Table II. 2: Percentage of time Infants spent in each functional state for the total time of observation in each group

INFANT	IVF	INF	NIP
Face Expressions			
RELAXED	26.0	19.8	22.2
WATCHING	39.8	38.9	56.7
COO FACE	11.6	15.5	8.5
HAPPY	18.7	13.1	12.3
UNHAPPY	3.9	12.8	0.4
Gaze Direction			
LOOK AT	70.9	55.7	56.5
LOOK AWAY	29.1	44.3	43.5
Head Orientation			
FACING	76.3	62.2	58.5
AWAY	23.7	37.8	41.5
Vocalisations			
NONE	83.2	72.6	88.3
PRESPEECH	4.6	10.7	7.1
COOING	8.1	7.1	4.0
DISTRESSED	4.2	9.6	0.6

Table II.3: Frequencies of all Possible Combinations of Categories for Mother

Fac.Expr	Position	Affect	Play	Total	EPISODES
neutral	held close	unexpres.	no	26	NEUTRAL
attentive	held close	unexpres.	no	146	ATTEND
calling	held close	unexpres.	no	21	AFFECTIONATE
happy	held close	unexpres.	no	178	AFFECTIONATE
unhappy	held close	unexpres.	no	2	NEGATIVE
neutral	held far	unexpres.	no	92	NEGATIVE
attentive	held far	unexpres.	no	242	ATTEND
happy	held far	unexpres.	no	341	AFFECTIONATE
unhappy	held far	unexpres.	no	1	NEGATIVE
neutral	held close	expres.	no	17	AFFECTIONATE
attentive	held close	expres.	no	85	AFFECTIONATE
calling	held close	expres.	no	10	AFFECTIONATE
happy	held close	expres.	no	82	AFFECTIONATE
neutral	held far	expres.	no	30	AFFECTIONATE
attentive	held far	expres.	no	65	AFFECTIONATE
calling	held far	expres.	no	1	AFFECTIONATE
happy	held far	expres.	no	189	AFFECTIONATE
neutral	held close	unexpres.	PLAY	6	PLAY
attentive	held close	unexpres.	PLAY	48	PLAY
calling	held close	unexpres.	PLAY	1	PLAY
happy	held close	unexpres.	PLAY	114	PLAY
neutral	held far	unexpres.	PLAY	11	PLAY
attentive	held far	unexpres.	PLAY	67	PLAY
calling	held far	unexpres.	PLAY	2	PLAY
happy	held far	unexpres.	PLAY	146	PLAY
attentive	held close	expres.	PLAY	7	PLAY
happy	held close	expres.	PLAY	5	PLAY
neutral	held far	expres.	PLAY	1	PLAY
happy	held far	expres.	PLAY	17	PLAY

Table II.4: Frequencies of all Possible Combinations for Infant

Fac.Expr.	Dir.Gaze	Orientation	Vocalisation	Total	EPISODES
neutral	look at	facing	prespeech	4	TALK
attend	look at	facing	prespeech	47	TALK
coo face	look at	facing	prespeech	9	TALK
happy	look at	facing	prespeech	7	TALK
neutral	look away	facing	prespeech	1	TALK
attend	look away	facing	prespeech	3	TALK
coo face	look away	facing	prespeech	4	TALK
happy	look away	facing	prespeech	1	TALK
attend	look at	away	prespeech	1	TALK
coo face	look at	away	prespeech	2	TALK
neutral	look away	away	prespeech	7	TALK
attend	look away	away	prespeech	10	TALK
coo face	look away	away	prespeech	2	TALK
happy	look away	away	prespeech	2	TALK
neutral	look at	facing	cooing	7	TALK
attend	look at	facing	cooing	32	TALK
coo face	look at	facing	cooing	116	TALK
happy	look at	facing	cooing	20	TALK
unhappy	look at	facing	cooing	1	TALK
neutral	look at	away	cooing	1	TALK
coo face	look at	away	cooing	3	TALK
happy	look at	away	cooing	1	TALK
happy	look away	away	cooing	1	TALK
neutral	look at	away	distressed	6	PROTEST
unhappy	look at	facing	distressed	33	PROTEST
neutral	look away	facing	distressed	2	PROTEST
neutral	look at	away	distressed	1	PROTEST
unhappy	look at	away	distressed	2	NEGATIVE
unhappy	look away	away	distressed	1	NEGATIVE

neutral	look at	facing	none	126	NEUTRAL
attend	look at	facing	none	523	ATTEND
coo face	look at	facing	none	66	PLAY
happy	look at	facing	none	141	PLAY
unhappy	look at	facing	none	34	NEGATIVE
neutral	look away	facing	no speech	21	NOT ATTEND
attend	look away	facing	no speech	35	NOT ATTEND.
coo face	look away	facing	no speech	1	NOT ATTEND
happy	look away	facing	no speech	2	NOT ATTEND
unhappy	look away	facing	no speech	2	NEGATIVE
neutral	look at	away	no speech	13	NEUTRAL
attend	look at	away	no speech	15	ATTEND
coo face	look at	away	no speech	3	PLAY
happy	look at	away	no speech	9	PLAY
neutral	look away	away	no speech	147	NOT ATTEND
attend	look away	away	no speech	228	NOT ATTEND
coo face	look away	away	no speech	6	NOT ATTEND
coo face	look away	away	no speech	83	NOT ATTEND
unhappy	look away	away	no speech	9	NEGATIVE

SAMPLE CODING SHEET OF 180 SECONDS SEQUENCE FOR MOTHER & INFANT

Time	Seconds	Mother3 group 1	Infant age 3
20.02	1	5	5
20.03	2	5	5
20.04	3	5	5
20.05	4	5	5
20.06	5	5	4
20.07	6	5	4
20.08	7	5	5
20.09	8	5	5
20.1	9	5	5
20.11	10	1	5
20.12	11	1	5
20.13	12	1	5
20.14	13	1	4
20.15	14	5	4
20.16	15	5	4
20.17	16	5	5
20.18	17	5	5
20.19	18	5	5
20.2	19	5	5
20.21	20	5	5
20.22	21	5	5
20.23	22	5	5
20.24	23	5	5
20.25	24	5	5
20.26	25	5	5
20.27	26	5	5
20.28	27	5	5
20.29	28	5	5
20.3	29	5	5
20.31	30	5	5
20.32	31	5	5
20.33	32	5	5
20.34	33	5	5
20.35	34	1	5
20.36	35	1	5
20.37	36	1	5
20.38	37	1	5
20.39	38	1	5
20.4	39	3	5
20.41	40	3	5
20.42	41	3	5
20.43	42	3	5
20.44	43	3	5
20.45	44	5	5
20.46	45	5	5
20.47	46	5	5
20.48	47	5	5
20.49	48	5	5
20.5	49	5	5

20.51	50	5	5
20.52	51	5	5
20.53	52	3	5
20.54	53	3	5
20.55	54	3	2
20.56	55	3	2
20.57	56	5	2
20.58	57	5	2
20.59	58	5	2
21	59	5	2
21.01	60	5	2
21.02	61	5	2
21.03	62	5	1
21.04	63	5	1
21.05	64	5	1
21.06	65	5	1
21.07	66	5	1
21.08	67	5	1
21.09	68	5	1
21.1	69	5	1
21.11	70	5	1
21.12	71	5	1
21.13	72	5	1
21.14	73	5	1
21.15	74	5	1
21.16	75	5	4
21.17	76	5	4
21.18	77	5	4
21.19	78	5	4
21.2	79	5	4
21.21	80	5	4
21.22	81	5	4
21.23	82	5	4
21.24	83	5	4
21.25	84	5	4
21.26	85	5	4
21.27	86	5	4
21.28	87	5	4
21.29	88	5	4
21.3	89	5	4
21.31	90	5	4
21.32	91	5	4
21.33	92	5	4
21.34	93	5	4
21.35	94	5	4
21.36	95	5	4
21.37	96	5	4
21.38	97	5	4
21.39	98	5	4
21.4	99	5	4

21.41	100	5	4
21.42	101	5	4
21.43	102	5	4
21.44	102	5	4
21.345	104	5	4
21.46	105	5	4
21.47	106	5	4
21.48	107	5	4
21.49	108	5	1
21.5	109	5	1
21.51	110	5	1
21.52	111	5	1
21.53	112	5	1
21.54	113	5	1
21.55	114	5	1
21.56	115	5	1
21.57	116	5	1
21.58	117	5	1
21.59	118	5	5
22	119	5	5
22.01	120	5	5
22.02	121	5	5
22.4	122	3	2
22.41	123	3	2
22.42	124	3	2
22.43	125	3	2
22.44	126	3	2
22.45	127	3	2
22.46	128	3	2
22.47	129	5	4
22.48	130	5	4
22.49	131	5	4
22.5	132	5	4
22.51	133	5	4
22.52	134	5	4
22.53	135	5	4
22.54	136	5	4
22.55	137	5	4
22.56	138	5	4
22.57	139	5	4
22.58	140	5	4
22.59	141	5	4
23	142	5	4
23.01	143	5	4
23.02	144	5	4
23.03	145	5	4
23.04	146	5	4
23.05	147	5	4
23.06	148	5	4
23.07	149	5	4

23.08	150	5	4
23.09	151	5	4
23.1	152	5	4
23.11	153	5	4
23.12	154	5	4
23.13	155	3	4
23.14	156	3	4
23.15	157	3	4
23.16	158	3	4
23.17	159	3	4
23.18	160	3	4
23.19	161	3	4
23.2	162	3	4
23.21	163	3	4
23.22	164	3	4
23.23	165	3	2
23.24	166	3	2
23.25	167	3	4
23.26	168	3	4
23.27	169	3	4
23.28	170	3	4
23.29	171	3	4
23.3	172	3	4
23.31	173	5	4
23.32	174	5	4
23.33	175	5	4
23.34	176	5	4
23.35	177	5	4
23.36	178	5	4
23.37	179	5	2
23.38	180	5	2

Illustration I
Mother with Infant in arms

Illustration II
Mother with Infant on lap

Illustration III
Father holding Infant

Illustration IV
Father with Infant lying on Sofa

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